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This Week in The IRON AGE

Vol. 156, No. 2 July 12, 1945

Editorial

An Editor Reads the Ads 43

o o o

Technical Articles

Precision Founding 46
Microscopy of Lead-Bearing Steels and Irons 49
Standardization of Shackles 50
Spray Setup of Polishing Wheels and Buffs 55
Color Code for Bar Stock 56
Pressure Sensitive Control of Furnace Dampers 61
A High-Strength Plastic Laminate 62
Iron Ore Concentrated by Flotation Methods 63
Electropolishing of Stainless Steel 64
New Equipment 64C

o o o

Features

News Front 45
Assembly Line 66
Washington 70
West Coast 74
Personals and Obituaries 78
Dear Editor 82
This Industrial Week 84
News of Industry 87

o o o

News and Markets

Excess Profits Tax Limit Reduced 102
War Plant Leased to Budd Co. 104
WPB to Speed Civilian Products 106
National Tube Speeds Tap Carbon Tests 110
Bombs for Japan 112
Canada Planning Postwar Activity 116
Willow Run Builds Last Liberator 122
AAF Fighters Carry Autopilot 124
Harvester Builds in Monterey 126
Machine Tool Market Developments 132
Nonferrous Metals News and Prices 134-6
Iron and Steel Scrap News and Prices 138-40
Comparisons of Prices by Week and Year 142
Finished and Semi-Finished Steel Prices 144-6
Warehouse and NE Steel Prices 148
Iron and Steel Pipe and Tubing Prices 150
Exceptions to Steel Price Schedule 6 152-3
Pig Iron and Coke Prices 154
Bolts and Nut Prices 155
Stainless Steel and Ferroalloy Prices 156-7

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Index to Advertisers 238

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When your shipment of Ryerson alloy steels arrives, complete test data comes with them—data that enables engineers and designers to call for the physical properties listed, with confidence that they can be secured—that furnishes heat treaters with a guide to sure, accurate results and provides a detailed record for your purchasing executive.

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THE IRON AGE

ESTABLISHED 1855

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An Editor Reads the Ads

"WHEN man bites dog—that's news." This was the nugget of wisdom bestowed upon a young reporter by an experienced news editor who had rejected a story based upon the situation in reverse.

Perhaps to many it will also be news that editors read the advertisements in their publications. Especially business paper editors. And most especially when they are far away from home.

Take, for example, the case of Bill Phair. Many of you will remember him as having been an Iron Age editor for a number of years before he put on Uncle Sam's garments and became a Seabee. They choose good men for that line of work!

Bill has been sojourning in the South Pacific for the past two years or more as an advance agent for the Marines. When the Marines get set to take an island away from the Japs, the Seabees go ahead to make things comfortable for them. They follow up the barrage to make roads on the landing beaches, scoop up the debris and litter of fallen trees—and dead Nips—so that our boys can get through to the remaining live ones and otherwise make themselves extremely useful.

Wherever Bill is located he will do a good job, for that is the kind of a guy he is. But the interesting part of it is that he is reading the advertising in your family journal from an entirely new basis of appreciation. (Once in a while a copy gets through to him).

Undoubtedly he formerly read the ads, as most of us do; while he was sitting at his desk in our New York office between trips. But it is one thing to read about, let's say, a caterpillar tractor while enjoying peace and quiet, and still another thing to read about it just after you have taken a dive from the driver's seat into the jungle to keep from becoming perforated.

Maybe you will be interested as we were in some comments in a recent letter from Bill.

> "I don't think that there is a name that has been in The Iron Age's pages that hasn't crossed my path sometime or another, and it's a bit of a thrill to open up some piece of equipment and notice the thousand and one little items and design features intended to make the equipment just a little more effective than you'd expect.
>
> "I still feel though, that much of our equipment is designed too finely. The use of a 7/16 in. bolt in one place, for example, and a half-inch in another just doubles the maintenance problem. On the other hand, it is remarkable how an engine produced in Detroit can be shipped through all these climatic changes, stand in open air storage for months and yet reaches us so well packed that in an hour's time we can have it operating smoothly."

Lots of other boys are having the same experience as Bill in seeing the old familiar advertised names in action and helping to win the war. It seems to me that this is going to mean something in the future when these chaps come home to take their places in industry!

Slag tests, far faster than chemical analyses, help Inland control the quality of steel.

Even Slag Tells A Control Story to Inland Metallurgists

Four or more times during each open hearth heat, slag samples of many grades of steel are taken, crushed, and dispatched, through a network of pneumatic tubes, to the Inland laboratory. Within a few minutes after the receipt of each sample, a laboratory technician, using a special, fast method for determining slag characteristics that has been highly developed by Inland, dispatches the result of the slag test back to the open hearth.

Inland has turned progressive slag tests into one of the most important and useful methods for continuous control of the process of steelmaking in open hearth furnaces. Inland Steel Company, 38 S. Dearborn St., Chicago 3, Ill.

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INLAND STEEL

The IRON AGE
July 12, 1945

NEWS FRONT

► The monthly ASF production rate has been revised downward by 32 per cent since February. According to present plans production in December 1946 will be reduced 42 per cent from the last full month of production for a two-front war.

► Reports from Los Angeles state that Kaiser Co. will spend $1,495,700 to remodel Fontana and install equipment for rolling sheet 3/16 in. and thinner. Also to be setup will be a unit to salvage blast furnace gas, mixing it with coke-oven gas and using it as a fuel in place of oil.

► Natural trends in the postwar period away from high cost production units will cause the Steel Corp.'s operations in the East to be somewhat curtailed in favor of more economical units in other districts.

► A buying mission here representing a number of India's industries is said to have been blocked from plant visitation by continuing security restrictions.

► The Foreman's Association of America, having established chapters in 46 steel plants since 1943, is awaiting NLRB action to establish collective bargaining rights in six steel plants.

► Most recent development in the trend to postwar industry diversification is Pressed Steel Car Co.'s interest in household appliances, heating and air conditioning equipment, and refrigeration.

► Virtually perfect combustion for natural-draft industrial furnaces is said to be obtained with an automatic damper control unit operating on furnace pressure rather than temperature.

► A promising new laminated plastic, Conolon, stronger and lighter than aluminum, resistant to vibration and to absorption of moisture, has been developed by an aircraft manufacturer.

► Savings effected by keeping buffing and polishing wheels cutting continuously can be had by spraying on a mixture of cold glue and abrasive.

► A substantial saving in furnace time after a heat has been "blocked", with freedom from scale, segregation and pipe, is reported for a novel carbon sampling technique in effect at some U. S. Steel Corp. plants.

► Last week's News Front report that Crucible Steel had shut down its electric furnaces in the Pittsburgh district because of lack of orders was unfounded. The Midland Pa. plant steelworks was shut down for a few days in the holiday week because of repairs, holiday and some vacation absences. Operations at Crucible at Pittsburgh are back to 90 per cent this week with electric furnaces operating.

► Since April 1, the Army Air Force has made two aircraft procurement cuts, totaling 43,792 airplanes and representing $7,590,000,000. Requirements for the current fiscal year are only one quarter in number and considerably lower in total weight than those in the fiscal year 1945 estimates.

The airplanes for the Japanese war are primarily Navy types and are already on order.

Surprisingly the 1946 fiscal year estimates includes funds for only 600 jet-propelled planes, which indicates less use of this type of craft than has been prophesied. However, once American troops get firm bases on the Japanese home islands there will be extensive utilization of robot bombs and long-distance rockets, partly on an experimental basis.

► The B-32 heavy bomber, a running mate to the B-29, stops production at the Government-owned plant at Fort Worth. As mentioned in News Front some eight months ago, the B-32 will occupy a minor role in prosecuting the air war.

► Ford went into 1946 model production only three days after WPB authorized new car production, this speed being permitted by large reserves of nearly every part held when the production line was shut down in 1942.

Ford's plans include eight complete lines, including three Fords, two Mercuries and three Lincolns. The Fords will include an engine of 100 hp, now in production; one with a six cylinder, 90 hp engine; and a new light Ford. Officials are shooting for a production rate of 8000 units per day as soon as unlimited production is authorized.

Precision Founding

o o o

By FRANCIS DITTMAR
Consulting Engineer, Metal Products
Buffalo, N. Y.

o o o

. . . In a series of nine articles, the author evaluates the features of several precision founding methods that have been practiced both here and in Europe. Utilizing the casting of a simple ring as a central example, the economies and limitations of each of the methods will be compared. In this first article is an analysis of the making of a wooden "try pattern," the first step in the process of arriving at accurate master patterns by trial and error. The second is the making of temporary glue molds, to be discussed in the second article.

METAL castings made by either the centrifugal or the vacuum process are not particularly recent. Neither is the pouring of molten metal into molds other than sand anything new. During the past century or so the practice in Continental Europe, for instance, has been to cast yellow brass, bronze and iron in gypsum leavened with burnt clay, such as brickdust. With the development of asbestos, this material was preferred to burnt clay; and later on, powdered quartz and other refractory materials came into use in casting metals requiring temperatures above 2000 deg. F. However, burnt clay, French sand and also coarser mesh sands as well as other materials of a like nature are still being used, particularly in the making of "cradles" for iron and steel castings.

At first the aim in making castings of this sort was not precision in regard to measurements; the accuracy desired was rather that of fidelity of reproduction. As this type of founding developed castings were made in yellow brass, bronze and iron of such sharp details and of so high a degree of finish that the work appears to have been carved.

Whether or not the molds for these castings were stationary, spun or subjected to vacuum pressure is for the moment immaterial. For that matter molds for cannon—bronze or iron—and for cast iron pipe were often spun, the molds being made of sand bonded with either linseed oil or molasses and baked—a process similar to present-day core making. Some decades ago piston rings for internal combustion engines were cast centrifugally in bonded sand molds. In one case the rings were 22 in. in diameter with a ¾ x 1 in. cross-section, and the castings were not turned or bored but were ground to a finish on their outside and inside diameters as well as on their faces; hence these castings were held within close limits.

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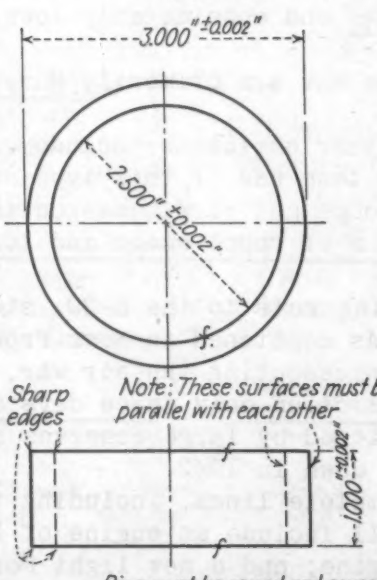
FIG. 1—Specification of the ring which will be cast in yellow brass from the try patterns.



Incidentally, the cores and molds for these rings were made in core-boxes having a slight draft. After baking, the molds were placed four to a flask, one atop the other, and a 16-in. diameter central core was firmly fixed in the cast iron flask containing the molds. The one-piece cylindrical flasks had no cover and the metal was poured into the air space between the outer wall of the central core and the inner wall of the mold. The flask was spun at 800 r.p.m. and the gates leading into the mold were 1/16 in. high by 5/32 in. wide. A more detailed description of circular castings, whether rings or patterns arranged in a circle, will be found subsequently in Part VIII.

In precision founding one cannot afford expensive patterns at the outset; the master pattern eventually arrived at is always a product of trial and error, is crept down to step by step by means of a number of waste or trial patterns which are used only once because they are destroyed in the process. It is because of the number of *try* patterns needed that in their making swift and cheap methods and materials must be taken advantage of; whether or not such try patterns are at first exact in regard to measurements is of no importance. At this stage low cost and speed are the main considerations.

Suitability for Foundries

And since this creeping-down to master pattern dimensions is of necessity slow, painstaking and often tedious, it might be argued with some degree of justification that precision founding is not suitable to a jobbing

foundry. There are, however, many instances when castings of a high degree of accuracy and finish can be made by any foundry provided the customer is prepared to pay for such accuracy and finish. Such instances would be those where neither centrifugal nor vacuum pressures are necessary to deliver required specifications and consequently no try patterns would be needed. The procedure of making patterns for such work will be found in Part III, and further detailed information regarding molds for such castings in Parts IV and VIII. In view of the increasing shortage of skilled molders, jobbing foundries may find it advantageous to consider this type of founding. Processes explained in this work and some practice, especially in the handling of plaster—described in Parts II and III—should enable almost any foundry to produce satisfactory castings economically.

In order to gain a comprehensive perspective of the entire field of precision founding it seems advisable to deal first with the matter from the mass production point of view. The master pattern, upon which mass production is based, must in its construction and dimensions compensate for a number of factors unpredictable at the beginning of each separate product. These factors are unpredictable because in precision founding the patterns stand in very close relationship to the mold, much more so than they do in sand founding. For one thing, the composition and construction of the mold will vary with the size and in particular with the gating of each pattern. Then, there is also the composition of the metal to be considered, a variable factor and depending, because of shrinkages, upon the nature of the alloy used. Another factor is the heat of the metal while pouring; still another, the centrifugal pressure of that metal against the walls and sections of the mold—a pressure, by the way, greatly compensated for in heavy castings by the use of cradles, as will be explained in Parts IV and X. There is the venting which must be concealed so that no trace of it is left on the castings. It is all very well to claim that a plaster-base or any other kind of mold is self-venting; such molds are self-venting only in the case of small castings such as those produced in dental laboratories or in jewelry factories—castings weighing no more than a few pounds or even less. For an unbroken schedule of mass produced precision castings of any size at all, positive venting is necessary if rejected castings are to be held to a

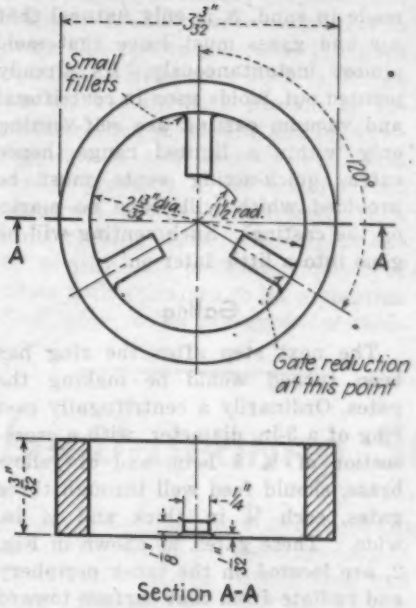


FIG. 2—Preliminary placing of gates to accomplish uniform distribution of metal. The number of gates are increased in the event that the piece does not come out with sharp edges (assuming that an increase in casting speed does not produce the desired edge).

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minimum. Such positive although concealed venting will be discussed in Part IV.

At first glance this citation of obstacles may seem discouraging because of the amount of labor involved prior to getting under way with production and also, possibly, because of the cost of materials and equipment. But in precision founding most of the

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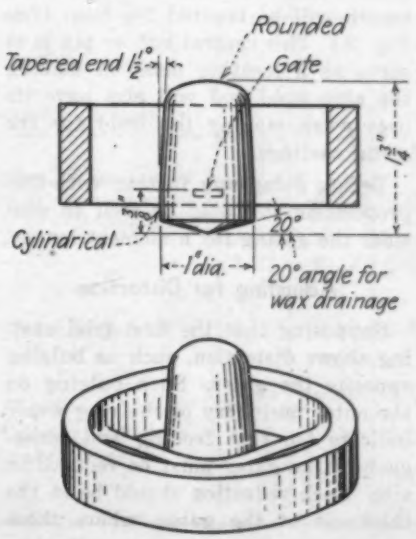
FIG. 3—Central tapered pin attached to gates (see Fig. 2). In addition to serving as a locating point when making the glue mold it has important use when making the mold for the metal castings. This feature is also discussed in succeeding articles.



labor cost lies in setting up, and once production is under way, there is comparatively little more of it, whereas in sand founding the last casting costs as much as the first. As to materials and equipment—the former can be purchased directly from manufacturers at a great deal less than from supply houses, while most of the equipment needed can readily be made on the premises as long as the foundry has some sort of a machine shop attached. It is the purpose of this article not merely to show every detail connected with precision founding but also to show how to make most of the needed apparatus—whenever this is practicable of course—and thus afford foundries an opportunity for individual requirements and preferments.

Try Patterns

In making the try patterns for the ring shown in Fig. I it may be agreed beforehand that the method about to be explained is not the only one by means of which the patterns can be made, and that it is not, perhaps, the most economical way in this particular instance. But the method explained presents a specific mode of procedure which, after it is understood, is not only applicable but is necessary to other phases of precision founding.

It will be observed that this ring has a 3-in. outside diameter, 2½-in. inside diameter and is 1 in. wide. Its cross-section is ¼ x 1 in. The tolerances are ±0.02 in. which means, among other things, that the casting must have a pretty smooth skin. Further, the ring is to be round within the specific tolerances and these also govern the concentricity of the ring inside and outside diameters. Still further, the edges of this ring are not chamfered; its specifications call for sharp edges. And lastly, the specifications demand flat, parallel surfaces on both outer and inner diameters; there is no draft whatever on the pattern. The material is yellow brass: 64 per cent copper, 33 zinc and 3 lead—or thereabouts.

Later in these articles the ring will be cast in iron and steel; here yellow brass is under consideration for reasons which will appear presently.

In order to avoid confusion features of this ring will henceforth be identified as follows: Its outer and inner diameters as its *outer* and *inner peripheries;* its two sides as its *faces.*

Obviously such a ring cannot very well be cast in a sand mold. It is not only a question of finish and accu-

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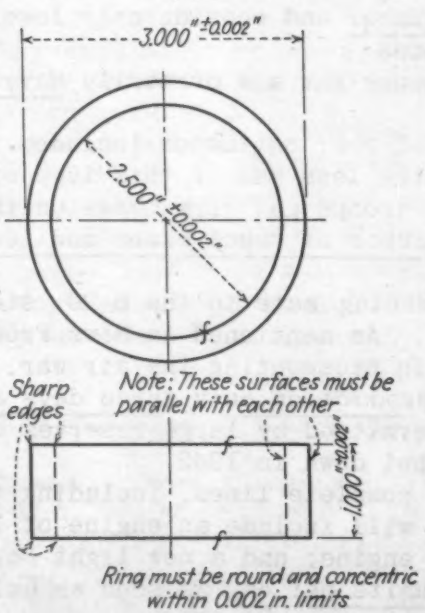

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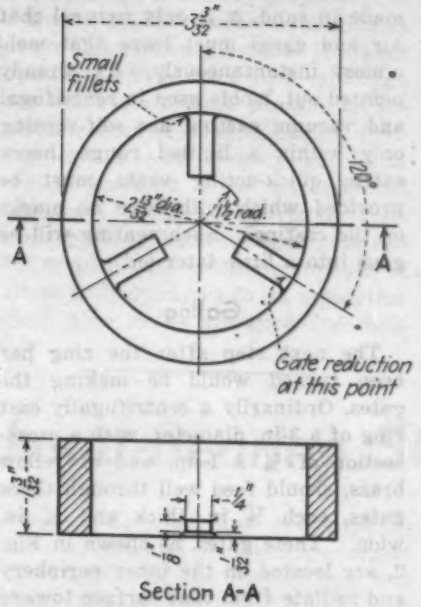

FIG. 2—Preliminary placing of gates to accomplish uniform distribution of metal. The number of gates are increased in the event that the piece does not come out with sharp edges (assuming that an increase in casting speed does not produce the desired edge).

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At first glance this citation of obstacles may seem discouraging because of the amount of labor involved prior to getting under way with production and also, possibly, because of the cost of materials and equipment. But in precision founding most of the labor cost lies in setting up, and once production is under way, there is comparatively little more of it, whereas in sand founding the last casting costs as much as the first. As to materials and equipment—the former can be purchased directly from manufacturers at a great deal less than from supply houses, while most of the equipment needed can readily be made on the premises as long as the foundry has some sort of a machine shop attached. It is the purpose of this article not merely to show every detail connected with precision founding but also to show how to make most of the needed apparatus—whenever this is practicable of course—and thus afford foundries an opportunity for individual requirements and preferments.

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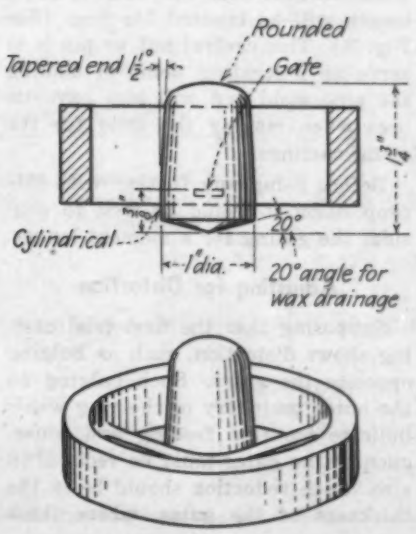
FIG. 3—Central tapered pin attached to gates (see Fig. 2). In addition to serving as a locating point when making the glue mold it has important use when making the mold for the metal castings. This feature is also discussed in succeeding articles.



Try Patterns

In making the try patterns for the ring shown in Fig. I it may be agreed beforehand that the method about to be explained is not the only one by means of which the patterns can be made, and that it is not, perhaps, the most economical way in this particular instance. But the method explained presents a specific mode of procedure which, after it is understood, is not only applicable but is necessary to other phases of precision founding.

It will be observed that this ring has a 3-in. outside diameter, 2½-in. inside diameter and is 1 in. wide. Its cross-section is ¼ x 1 in. The tolerances are ±0.02 in. which means, among other things, that the casting must have a pretty smooth skin. Further, the ring is to be round within the specific tolerances and these also govern the concentricity of the ring inside and outside diameters. Still further, the edges of this ring are not chamfered; its specifications call for sharp edges. And lastly, the specifications demand flat, parallel surfaces on both outer and inner diameters; there is no draft whatever on the pattern. The material is yellow brass: 64 per cent copper, 33 zinc and 3 lead—or thereabouts.

Later in these articles the ring will be cast in iron and steel; here yellow brass is under consideration for reasons which will appear presently.

In order to avoid confusion features of this ring will henceforth be identified as follows: Its outer and inner diameters as its *outer* and *inner peripheries;* its two sides as its *faces.*

Obviously such a ring cannot very well be cast in a sand mold. It is not only a question of finish and accu-

racy; the two flat sides and also, to some degree, the sharp edges would make sand casting impossible. Consequently, this job is one for centrifugal casting. Furthermore, because of the flat, parallel sides and the sharp edges demanded by the specifications it will be necessary to use a wax pattern. In other words, this is a run-out job, made via the *cire-perdu* or "lost-wax" process.

Lost-Wax Aspects

This lost-wax process, while not precisely an essential feature of precision founding, would be necessary in the present case because a straight-sided pattern could not be gotten out of a plaster-base mold after that mold has set. Secondly, a split mold cannot be used because, besides being expensive to make under mass production, such a mold would also be apt to leave seams or fins on the casting and such fins are out of the question because of the tolerances specified. No snagging can be done on these castings since snagging would destroy their accuracy. There will be, of course, the gates to contend with, but these can be so small that what remains of their traces can be removed with a file—just a touch, so that the file marks blend with the casting skin and will in nowise interfere with the job's accuracy.

Should quantity warrant the expense, a shearing tool of the punch and die order could be used provided the castings have been poured in a plaster and asbestos mold. If, on the other hand, the mold contained gritty refractory materials, such a speedy method of removing gates could not be used. It is of the utmost importance to give careful consideration to every separate step to be taken in each new casting proposition.

In the present case, the first step would be to turn a ring in some hardwood, being made about 3/32 in. big all over. That is, the ring would be 3/32 in. big on its outside diameter and 3/32 in. small on its inner diameter and the 1-in. width would be increased to 1-3/32 in. This addition, 3/32 in., would just about take care of shrinkages.

Other difficulties that may appear would be due to mold construction and would not likely be remediable with pattern adjustments, this being just a plain ring. But in view of the high zinc and, especially, lead content of the metal used, some trouble may develop as a result of insufficient, improper or slow venting. As to the latter factor, since metal enters a spun mold very much faster than it enters a stationary one, let alone one that is made in sand, it is only natural that air and gases must leave that mold almost instantaneously. As already pointed out, molds used in centrifugal and vacuum casting are self-venting only within a limited range, hence extra, quick-acting vents must be provided which will leave no marks on the castings. Such venting will be gone into a little later on.

Gating

The next step after the ring has been turned would be making the gates. Ordinarily a centrifugally cast ring of a 3-in. diameter, with a cross-section of ¼ x 1 in. and of yellow brass, should feed well through three gates, each ⅛ in. thick and ¼ in. wide. These gates, as shown in Fig. 2, are located on the inner periphery and radiate from that surface toward the ring's center. Each of these three gates is to feed an annular section of wall ¼ in. thick, 1-in. high and about 2.6 in. long and therefore should be evenly spaced so as to distribute uniformly the metal.

As shown in Fig. 2, the gates are fastened 1/32 in. inside one of the two faces—which one does not matter since there is no draft on the pattern. This is done so that the face nearest the gates can be shaved off later, when reducing the width of the ring to master pattern size without interfering with the thickness of the gates.

The pattern with its three gates in place will look like a three-spoked wheel with its hub removed; the space that the hub occupied should be about 1-in. diameter, and the gates radiating out from this center space must be of even length. For into that space between the gates there will now be placed a central, tapered pin 1¾ in. long. Where this pin fits the gates it will have a ⅜-in. long cylindrical surface while the balance of its length will be tapered 1½ deg. (See Fig. 3.) This central hub or pin is to serve as a locating point in making the glue mold and will also have its uses when making the mold for the metal castings.

Before going any further with this proposition it would be well to consider the gating for a moment longer.

Adjusting for Distortion

Supposing that the first trial casting shows distortion, such as bulging opposite the gates. Such bulging on the outer periphery of the ring would indicate too fast feeding and consequently the gates must be reduced in size. Such reduction should be in the thickness of the gates, where these join the inner periphery of the ring and not in their width.

Should the next trial casting show no distortion but have, for instance, dull edges—remember sharp edges are wanted—the feeding would be too slow, all other things being equal. The metal did not get into the mold fast enough. The most immediate remedy for that would be to speed up the mold which, for example, let us assume has been spun at 500 r.p.m. An increase of revolutions to 650 or to 700 r.p.m. might remedy that fault.

But should the edges still be dull after an increase of revolutions the gates should now be reduced further in size at their entrance into the mold, both as to thickness and to width, and three additional gates should be added so that there now are six small gates instead of the three original big ones. As a matter of fact, the more small gates there are, the better the casting obtained, and the only reason why one starts with as few gates as possible, even when these are big and so leave comparatively large marks on the casting, is that it is cheaper in mass production. For one thing, fewer gates save metal, and for another, there is less cleaning up to be done on each casting. Obviously it is sound policy to begin with as few gates as possible, and to increase the number only when absolutely necessary, i.e., when all other remedies have failed to produce satisfactory results; in this fashion arriving at a point where there are just enough gates to meet with the casting's specifications.

Referring to the bulging mentioned above, such distortion is not always due to wrong gating or to the speed with which the mold is spun. Faulty castings will also result from a weak or from too tight a mold structure, from pouring metal either too hot or too cold, from too high to a mild temperature or from one too low—all of which will be discussed in Parts IV and X.

From the finished wooden pattern, with gates and central hub in place, all parts shellaced and smoothly sandpapered, the try patterns are made. Since a couple of dozen or more might be needed before the precise dimensions of the master pattern can be ascertained these try patterns are to be made of plaster. Should additional gates be needed these will also be made of plaster and glued onto the plaster try pattern by means of burnt shellac. The method of obtaining burnt shellac will be discussed in Part III.

In order to make these try pat-

terns, each one an exact duplicate of the wooden one, a completely flexible mold is necessary into which the plaster is to be poured. The simplest and cheapest way to make that mold is to use horn glue. To be sure, there are on the market chemical compounds called "moulanges" and these may be used with good results. These moulanges, however, require a lower melting heat than does horn glue and are therefore a little risky to use because plaster in setting develops heat and so is apt to destroy the mold. For ordinary foundry work horn glue is preferable not only because it stands up under a little more heat—although not much more heat, as will be explained when discussing plaster casting—but is also inexpensive. It is easily procured from either retail hardware stores or directly from meat packing houses. Horn glue can be remelted an indefinite number of times without injury to its properties. Such glue molds are good for thousands of plaster casts; its length of life depends a great deal upon proper use and the care taken of it when idle. It will reproduce any detail with absolute fidelity and is so flexible that drafts and undercuts are of no consequence.

[*Having evaluated the factors which make horn glue a satisfactory molding material for try patterns, the author will discuss in the second part of this article the techniques of the glue mold.*]

Microscopy of Lead-Bearing Steels and Irons

VARIOUS investigators of lead-bearing steels and irons have offered evidence to support their conclusions that most of the lead in these materials is present in the form of finely dispersed particles of lead and/or constituents containing lead. Although microscopic examination of lead-bearing steels has failed to detect inclusions which could be identified with lead, radiographs of lead-bearing steel ingots show segregation of lead and microradiographs of wrought lead-bearing steels indicate the presence of fine inclusions of lead or constituents containing appreciable amounts of lead. It has also been reported that when such steels are heated to 752 deg. F. in a neutral atmosphere, lead oozes and forms droplets on the surface. It is this phenomenon that is the basis of the exudation test which a steel is required to pass before being accepted as lead-bearing.

Further work on this subject was undertaken by T. H. Schofield at the National Physical Laboratory, Teddington, England, and presented to the Committee on the Heterogeneity of Steel Ingots of the British Iron and Steel Institute.

Six materials were studied, four lead-bearing and two lead-free. Chemical analyses and other data on these materials are given in the accompanying table. Sections of the ingot were prepared for microscopic examination by grinding on progressively finer grades of emery cloth and paper down to the 00 grade which was followed by polishing on a rotating pad of broadcloth charged with a commercial grade of fine alumina and lubricated with water. The surface was finished on a similar pad, using chromic oxide and water.

Using this technique, all the lead-bearing materials showed inclusions having a rough and mottled appearance, in addition to the inclusions normally present in steels. The inclusions were sometimes free, but were frequently attached to other inclusions. None of these inclusions was seen in the lead-free materials, but inclusions of similar appearance were observed in a lead-bearing 70-30 brass. A confirmatory examination of one of the specimens by another investigator revealed inclusions of similar form but lighter in color than those obtained by the author. Since it seemed possible that the darker and mottled appearance of the inclusions might be caused by their partial removal during polishing, a modified polishing technique was tried. The specimens were polished on velveteen by hand directly from the 00 stage, using specially prepared alumina and water made slightly alkaline by adding a few drops of ammonia solution. Using

* *Prepared by adding 2 or 1 volumes of nitric acid (specific gravity 1.40) to 98 to 99 volumes of absolute alcohol with an excess of crystalline potassium iodide. The excess potassium iodide is filtered off and the filtrate applied to the polished surface of the specimen for 10 to 30 sec. The surface is washed in alcohol and dried in hot air, and must not be touched before examination.*

(CONCLUDED ON PAGE 130)

Details of Materials Examined

Description of Material	Size and Location of Samples	Chemical Analysis C	Si	S	P	Mo	Ni	Cr	Pb
No. 1 ingot of lead-bearing carbon steel	Two specimens of each steel 1 x 1 x ½ in. from near rim and center of mid-transverse section of ingot.	0.27	0.145	0.032	0.027	1.02	.....	.....	0.16
No. 2 ingot of lead-bearing carbon steel		0.27	0.17	0.031	0.026	0.80	0.10	0.065	0.16
Wrought lead-free nickel-chromium steel	Section of square billet 5 x 5 x 2½ in.	0.29	0.20	0.008	0.023	0.47	4.37	1.31	.....
Wrought lead-bearing nickel-chromium steel		0.29	0.20	0.008	0.023	0.47	4.37	1.31	0.26
Lead-free ingot iron	Specimen taken about 8 in. from top and near rim of ingot.	0.02	0.01	0.024	0.009	0.05	.....	.....	.....
Lead-bearing ingot iron		0.02	<0.01	0.043	0.009	0.04	.....	.....	0.24

Standardization Of Shackles

. . . A fatal accident resulting from the failure of a wire rope sling shackle at the California Shipbuilding Corp. yard, Wilmington, led to an extensive investigation of drop forged shackle quality and the drawing up of rigid specifications for inspection and test, out of which it is hoped a national standard will eventually be developed. The investigation work at Calship was carried on under the supervision of Sverre Kongelbeck, then plant engineer.

SHACKLE failures in industry have, during the last few years, become frequent occurrences resulting in loss of life, personal injury and considerable material damage. One particular case occurring at the California Shipbuilding Corp. was the cause of an investigation of the shackle problem from the viewpoint of safety. This accident occurred when a stern frame assembly weighing slightly more than 20 tons dropped 30 ft., killing a worker and barely missing several other persons, besides causing extensive damage to the hull under construction. This stern frame assembly had been properly rigged and a shackle of proper size had been selected evidently insuring a safety factor of 6 in relation to the ultimate breaking strength of the shackle as generally listed in manufacturers' catalogs.

This particular shackle was a drop forged, anchor type screw pin shackle and examination of the fractured parts showed that the shackle had not been noticeably deformed prior to failure. This observation led to close examination of the shackle material including complete chemical analysis of clevis and pin material and determination of the physical properties from a standard tensile specimen cut from one of the fragments. Microphotographic analysis for structure and grain size was also conducted as well as visual and Magnaflux examination for evidence of cold work or other abuses during manufacture, cracks, seams, cold shuts and forging defects. Suffice it to say that the forging had been made from bessemer steel bar stock. This type of steel is commonly called "free cutting" steel and has many useful applications, but it is not a material suitable for forged shackles.

This incident, which occurred over a year ago, led to the establishment of a thorough shackle inspection program embracing the testing of all shackles issued to the yard, all shackles in warehouse stock as well as all new consignments of shackles arriving at the warehouse.

Prior to the inauguration of the testing program, shackle failures were regular occurrences causing considerable loss of production, property and in some instances loss of life or severe injury to the workers. Not a single shackle failure has occurred since the program was inaugurated.

Since almost every commodity of equal importance as shackles is governed by nationally recognized standards, it is surprising to find that the manufacture of shackles has not been governed by specifications other than incomplete and to a great extent faulty specifications, such as Navy Specification 42-C-19 (Int.), to mention one example.

In order to achieve safety and economy it became evident that steps should be taken immediately to correct this condition and have a set of specifications drawn up that would be acceptable both to manufacturers and users alike.

As part of this program Calship's plant engineer visited a number of manufacturers of shackles who have been in that business for half a century or more, as well as several shipyards in the East. In the course of these discussions, it was brought out that accidents caused by shackle failures and difficulties in obtaining shackles of sound quality was by no means a local Calship phenomena. Several opinions were verified:

(1) In all instances where bessemer steel bar stock has been used, for example, the resulting shackles were of inferior quality and failed in use at loads far below what is generally considered as a "safe working load" for a drop forged open hearth steel shackle of the same size. It is suggested, therefore, that no shackles be allowed to be manufactured from bessemer steel.

(2) The quality of the bar stock should be controlled as per Federal Specification No. QQ-S-763a, paragraph 2C:

"All material shall be uniform in quality and condition, free from pipes, seams, laps, cracks, slag, hard spots, porosity, slivers, scabs, rolled-in scale, excessive non-metallic inclusions, segregation, and other defects that might detrimentally affect its suitability for the service intended."

(3) Preheating temperatures in the forge shops cannot practically be controlled by other than judgment and the variable conditions in the forge shop tends to produce a great variation in, and often too high, preheating temperatures. It seems that the only practical method of obtaining uniform sound quality shackles is to normalize the finished forgings from controlled temperatures.

(4) The slip eye bore should only have a sufficient tolerance over the pin diameter to allow the pin to be screwed in by hand and should be concentric with the threaded eye bore.

(5) The finished shackle should in general pass an inspection program such as is currently carried out at Calship.

In the past it was the custom of Calship to purchase shackles as stand-

NEW shackle received from warehouse stock. Shackle failed at approximately 2000 lb. The crack in this shackle was not visible at the start of the proof load test. Upon proof loading, it immediately opened up and failed as shown. Was not Magnafluxed prior to proof loading.

Shackle Pin Size, In.	Proof Load — Lb. (First)	(Revised)
⅞ I	17,136	14,700

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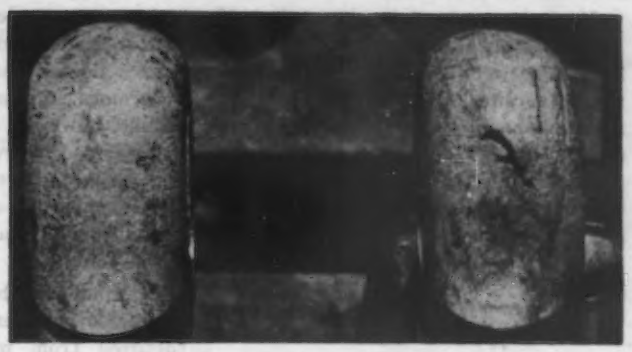
VISIBLE cracks in the eye of this new shackle were cause for rejection. These cracks were fairly deep. The shackle withstood proof loading. However, it is highly doubtful if the shackle would be satisfactory under impact loading or fatigue. Corrosion inside the cracks would further weaken the shackle if used on production.

Shackle Pin Size, In.	Proof Load — Lb. (First)	(Revised)
1½ 1⅝	48,552	40,000



NEW shackle was rejected visually because of hot tears on the slip eye of the shackle. Shackle withstood proof loading satisfactorily, however.

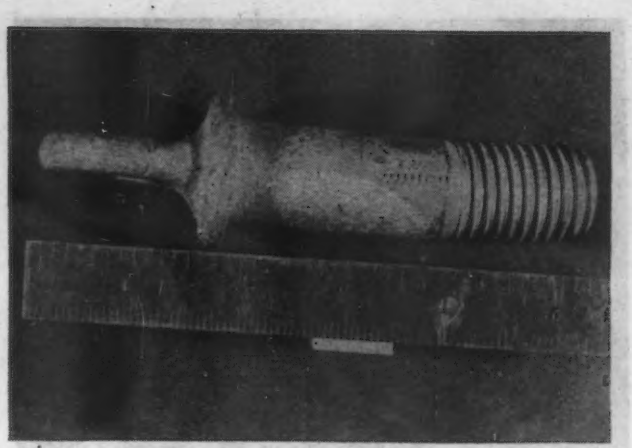
Shackle Pin Size, In.	Proof Load — Lb. (First)	(Revised)
⅞	17,136	14,700

ard hardware items from jobbers without specifically asking that the lot satisfy certain minimum strength requirements or be of a specified manufacture. As a result, in one consignment there would be quite a variety of one particular size shackle from several manufacturers, with great variations in their physical properties. Inasmuch as during the war emergency period several hundred new manufacturers were encouraged to take up the production of shackles, and in view of the inconsistent quality of their products it can be assumed that there prevails a substantial lack of control and judgment in the selection of raw materials as well as of the manufacturing processes used by these various suppliers.

Investigations carried out at Calship included laboratory tests such as chemical analysis of the material; microphotographic examination of etched specimens for the determination of grain structure and grain size; Rockwell and Brinell hardness tests; and tensile tests for the determination of ultimate stresses, the yield stress, the elongation and reduction in area. The shackles themselves have been subjected to tensile tests in order to determine the ultimate strength, the deformation under load, as well as the establishment of such proof test loads that would be required in the inspection program in order to classify the shackle as safe or unsafe for a standard working load and working condition.

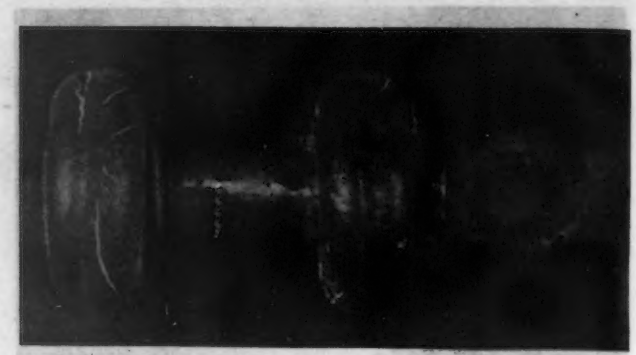
All shackles that were previously issued to the yard were withdrawn and tested at the established proof test load and the specimens which failed to pass the test were scrapped. The balance of the specimens were then subjected to Magnaflux tests for indication of invisible cracks that might have developed during the proof loading and also for possible defects developed during the manufacture of the shackles. Shackles failing to pass the Magnaflux tests were also discarded. New and used shackles in warehouse stock were also examined in a like manner, and new consignments arriving at the yard were subjected to the same approval testing and inspection. Some of the results of these tests are shown in the accompanying illustrations.

There may be some objection on the part of vendors to the acceptance of rejected material, since they have not been notified of this inspection schedule, nor have they guaranteed their products to stand up under such a proof test load. This in itself illustrates to a great extent the need for standard specifications to be drawn up that are acceptable to both the ven-



THIS shackle pin was in a new shackle and under proof loading the pin deformed. The pin also shows a reduction in area on the screw threads; therefore, a consequent notch effect between the bearing part of the pin and the threads. The slip eye diameter was too large compared to the pin diameter. Bending occurred at the screw end part of the pin as shown.

Shackle Pin Size, In.		Proof Load — Lb. (First)	(Revised)
⅞	1	17,136	14,700



THIS used shackle shows cracking both longitudinal and transverse in shackle clevis. Rejected by Magnaflux.

Shackle Pin Size, In.		Proof Load — Lb. (First)	(Revised)
⅞	¾	8,925	7,350

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dors and to the users.

As matters stood in the spring of 1945, Calship was rejecting as unfit for use between 20 and 30 per cent of the total shackles purchased. These rejected shackles are returned against credit to the vendor. A very large percentage of the shackles initially in the yard at the inception of the testing and inspection program failed to meet safety requirements and were scrapped.

Types of Shackles

Shackles as used in the Calship yard are all of the screw pin, anchor type, drop forged steel shackles. The chemical analysis of the material as currently supplied varies widely from vendor to vendor and in several cases inconsistencies of serious nature have been noted on shackles taken from an individual consignment. It is the Calship's belief that unless shackle material is so specified as to fall within certain limits of chemical composition and specified maximum preheat temperatures for drop forging and a subsequent minimum normalizing temperature, there will be no consistency of quality of the shackles brought into the yard and the testing program becomes difficult and expensive.

It is always well to ask oneself what is the criterion of the desired qualities of a product. As far as Calship is concerned the answer to this question regarding shackles would be as follows:

The shackle should neither be too hard nor too soft. The degree of hardness should be so controlled as to allow for a proof test load of at least twice the safe working load to be applied to the shackle without permanently deforming the shackle to such an extent that the pin binds to a degree that removal by hand becomes impossible. At the same time, however, a degree of ductility is desired in order that the shackle, in case of extreme overloading, will deform considerably before fracture in order to warn the operators of the condition.

It is believed by Calship that such a shackle can very readily be manufactured from medium carbon steel bar stock in the following analysis ranges:

C —0.20 to 0.35 per cent
Mn —0.50 to 0.90 per cent

without increasing the manufacturing cost noticeably by the normalizing heat treatment, and at the same time maintaining the ultimate strengths as listed by the leading manufacturers.

When selecting a shackle for a particular purpose, the given ultimate breaking strengths are taken for granted and knowing the load the shackle is required to suspend, a so-called safety factor is selected in relation to this ultimate breaking strength and on this basis a certain size shackle is selected. The reliability of the figure given as ultimate breaking strength is never questioned.

Inasmuch as the shackles are manufactured by a variety of methods and from a wide range type of steels, it is obvious that no uniformity of product can be expected. While selection of the correct type of steel is a prerequisite for obtaining the desired quality, overheating of the material will lead to grain coarsening and decreased tensile properties and give a brittle material susceptible to work hardening and laying the ground work for fracture and accidents.

Proof Test Used

To safeguard against shackle failures, at Calship every shackle used for direct lifts is now given a proof test loading equal to twice the maximum allowable working load. The shackles are first tested when arriving at the warehouse and retested after each 60 days in use. Shackles failing to pass the proof test load and the subsequent visual and Magnaflux inspection are destroyed and scrapped.

It is suggested by Calship that a safety factor of *6* be universally applied in obtaining a safe working load and that the manufacturers list only these safe working load figures in their catalogs, and only give the ultimate breaking strengths upon application. With a proof test load of twice the working load, this means then that a good shackle should be so manufactured that it can withstand a proof test load of one-third of the ultimate breaking strength without deformation of a magnitude that would render the pin hard to remove by hand.

Specifications for Shackles

As a result of the work that has been done to date the following specifications have been set up by the California Shipbuilding Corp.:

"All shackles shall be of forged steel from open hearth bar stock of any of the following classifications:

SAE 1020
SAE 1025
SAE X 1025
AISI C 1026 or C 1023

Pins must be of the same material as the clevis.

"All shackles whether anchor or chain type shall be fitted with screw pin, Class II thread fit; length of thread shall be sufficient to allow the pin to be screwed in with shoulder contact against the face of the unthreaded eye. The bore of the unthreaded eye shall not exceed the pin diameter by more than what is deemed necessary to provide adequate clearance.

"Shackle pins shall run sufficiently free to be removed by hand before and after proof test loading according to the following tabulation:

Shackle Size, In.	Proof Test Loading, Lb.
¼	1,300
5/16	2,000
⅜	2,700
7/16	3,700
½	4,700
⅝	7,350
¾	10,700
⅞	14,700
1	20,000
1⅛	24,000
1¼	28,700
1⅜	35,000
1½	40,000
1¾	53,250
2	70,000
2½	100,000

"Shackles failing in this proof test loading will be returned to the vendor at his expense.

"All material should be uniform in quality and condition, free from pipes, seams, laps, cracks, slag, hard spots, porosity, slivers, scabs, rolled-in scale, excessive nonmetallic inclusions, segregation, and other defects that might detrimentally affect its suitability for the service intended.

"The material should contain no welds. Defective shackles shall be returned to vendor at his expense.

"Cast steel shackles and shackles made from bessemer steel are not acceptable.

"These specifications supersede all previous specifications on shackles as issued by the Plant Engineering Department and will be in effect until complete national specifications are available."

The proof testing loads are based on 100 per cent overload at safety factor of *6*, that is:

$$P_l = 2\ W_l$$

Where W_l = Ultimate breaking load

$$\frac{}{6}$$

Shackles must be able to withstand the above proof load without showing:

1—Failure either partial or complete

2—Excessive deformation

3—Binding of pin which must be free to screw in all the way by hand.

Shackles are proof loaded in direct tension under a steady load in a suitable jig to give a nearly full pin bearing and not produce a nick on the clevis (use copper, bronze or other suitable pads).

Before proof loading all shackles are visually inspected and are rejected if any of the following defects are observed:

1—Cracked shackles
2—Shackles showing excessive notches or sharp deep nicks
3—Shackles showing irregular sections
4—Shackles which have pins that will not screw into thread without binding
5—Shackles having pins that do not fit with a reasonable tolerance based on judgment as to usability of shackle in production.

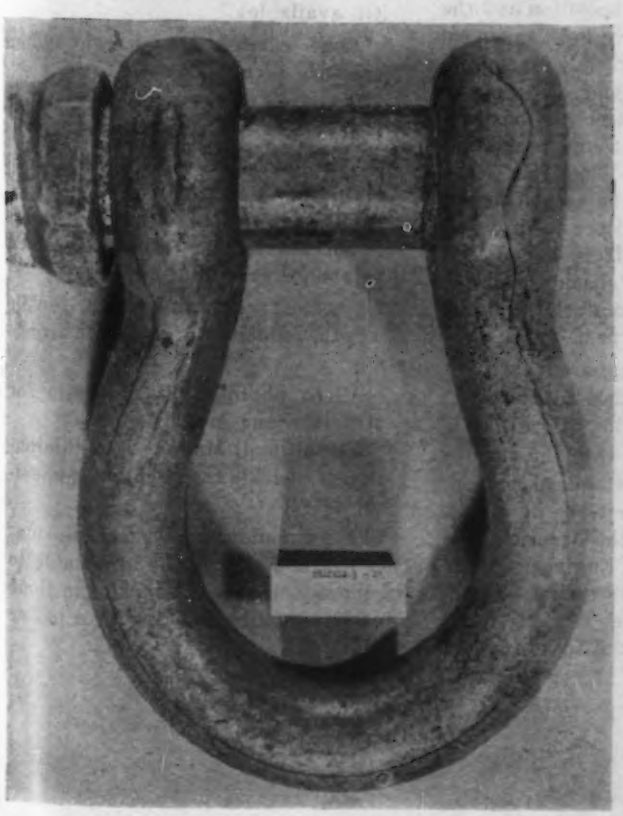
After proof loading and visual inspection all shackles are Magnaflux tested and those showing the following defects are discarded:

(a) Surface defects:
1—Seams

o o o

THIS new shackle was rejected by Magnaflux because of longitudinal seams. (Typical defect of this type.)

Shackle Pin Size, In.		Proof Load — Lb. (First)	(Revised)
2	2¼	91,428	70,000

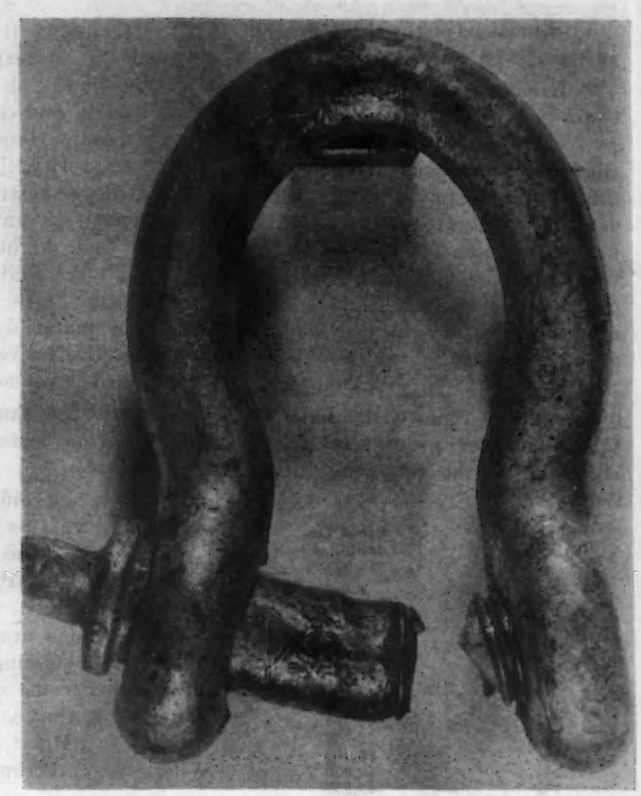


USED shackle which passed proof load but was rejected by Magnaflux because of cold work wrinkles in bow and longitudinal seam.

Shackle Pin Size, In.		Proof Load — Lb. (First)	(Revised)
1	1⅛	22,134	20,000

USED shackle failed under proof load as shown at approximately 7000 lb. Ductile failure.

Shackle Pin Size, In.		Proof Load — Lb. (First)	(Revised)
⅝	¾	8,925	7,350



THIS shackle failed in service due to excessive load. Pin shows extreme abrasion and failure through shear. Typical break of a satisfactory shackle which was overloaded.

Shackle Pin Size, In.		Proof Load — Lb. (First)	(Revised)
¾	⅞	12,638	10,700

o o o

2—Checks
3—Forging laps
4—Inclusions
5—Cracks—surface
6—Cracks—fatigue
7—Hot tears

(b) Sub-surface defects:
1—Seams
2—Cracks
3—Inclusions
4—Cavities
5—Porosity
6—Laminations.

A color code was adapted to show the period, in two month intervals, in which the shackles were to be used in the yard before being retested.

Shackles ⅞ in. or over in size are tested 100 per cent before acceptance for use. Smaller sizes are tested by using the results on 20 per cent of the lot. In case any of the 20 per cent are unsatisfactory, the complete lot will be tested. All rejected shackles are tagged with tags showing the cause for rejection, inspector's name and date.

The shackles tested run into many thousands. Calship feels that the expense involved and the responsibility resting on the testing laboratory are unreasonable. A far better solution for all concerned would be for shackles to be manufactured and tested to rigid specifications by the manufacturer, the quality of shackles to be backed by his integrity and guaranteed by him. This proposition and the problems involved have been taken up with the leading shackle manufacturers and with the American Society of Mechanical Engineers who have all pledged their support and assistance toward this purpose. The ASME has under consideration the establishment of a standards committee to draw up shackle standards. It is hoped that through this effort shackle failures caused by defective material will become a thing of the past.

In view of the apparent lack of medium through which to exchange experiences of shackle failures, it is suggested by Calship that the various industries follow a standard pattern of research and submit the data to a central body such as the American Society of Mechanical Engineers, New York. The pattern followed at Calship may not cover all cases but in general it is suggested that the following observations and examinations be conducted:

Shackle type and size

Manufacturer's name and address (if available)

Load carried by shackle when fracture occurred

Type and location of fracture (sketch)

Chemical analysis of material both for clevis and pin

Rockwell or Brinell hardness tests

Cut out tensile testing specimen (standard or miniature)

Examine for yield strength, tensile strength, reduction of area and elongation.

Micro photographic analysis for structure and grain size

Visual and Magnaflux examination of shackle fragments for physical defects.

The accumulation of such information will undoubtedly be invaluable to the manufacturers of shackles in their efforts toward the making of a better product.

▲ ▲ ▲

Spray Setup of Polishing Wheels and Buffs

SPRAYING of a mixture of cold glue and abrasive on buffs and polishing wheels to keep them cutting continuously is showing substantial production economies, compared with work done on wheels set up in the conventional manner. For satin finish work, for example, this method increases production from two to four times as the operator does not have to stop every few minutes to pick up the bar of greaseless compound ordinarily used for this work, although the results are similar to the "head" produced with such a compound. Material consumption is decreased by at least 50 per cent, it is also claimed.

The method and equipment are a development of the J. J. Siefen Co., Detroit, which introduced liquid cold glues for wheel setup in 1941 and later brought out "Brushing Nuglu," a mixture of cold glue and abrasive grains which could be brushed directly on a polishing or buffing wheel.[1]

The latest development embodies an abrasive glue mixture called Nu-Spra-Glu which is applied by means of a foot-operated spray gun mounted on the hood of the polishing stand, Fig. 1. One stroke of the foot pedal sprays a small amount of the abrasive mixture on the buff. This dries instantly due to the heat of the buff in production, suction from the ventilating system and rotation of the wheel. Hence polishing can be started or resumed immediately.

Any grain size from Nos. 80 to 600 can be used, thus permitting a wide variation of cut and finish. The grain is held on the face securely, thus obtaining full use of its cutting power. Nu-Spra-Glu can be sprayed on any type of buff—spiral sewed, square sewed, loose or bias type. For most satin finish work, the first spray on a well dressed short-nap wheel produces excellent work. For more severe cutting quality, a head can be built up in a short time and can be maintained uniform without any waste of time.

Since wheels coated in this way operate with such a light head of abrasive, it is essential that the work be free of grease and oil to insure a grease-free wheel or belt. The sprayed material will not adhere otherwise.

This spray gun method is ideally adapted to automatic buffing machines, either straight line or rotary. The actuating valve can be automatically operated in many different ways for various kinds of machines.

This method of setting up can also be used for renewing belt life on coated abrasive belts.[2] Fig. 2 shows Nu-Spra-Glu being applied to a short polishing belt with a hand gun. A speed changing device in the drive enables a wide range of running speeds to be selected. Equipment of this type as well as the glue-abrasive mixture is obtainable from the Siefen company.

(CONTINUED ON PAGE 130)

[1] *See "Polishing With Liquid Cold Glue,"* THE IRON AGE, *May 1, 1941 and "Polishing With Glue-Abrasive," March 18, 1943.*

[2] *For a method of restoring belts with Brushing Nuglu see "Abrasive Belts Recoated,"* THE IRON AGE, *April 6, 1944, p. 58.*

FIG. 1—Through the foot operated spray gun atop the hood of this polishing lathe, the operator builds up a light coating of abrasive on the buffing wheel. Abrasive suspended in cold glue is fed from the pressure container at lower right.

FIG. 2—Booth and power driven pulley setup for spray coating short abrasive belts, thus renewing their life. Shaft is tapered to take a wide range of wheel hub diameters.

Courtesy-Towmotor Corp.

A well designed color code for bar stock insures against issue of wrong steel to machine shop.

STRANGELY enough bar stock is analogous to canned goods. The outward appearance of both gives no inkling as to the inward content. A can of applesauce looks for all the world like a can of stewed prunes; a bar of AISI 1020 cold drawn steel looks no different from a bar of AISI 4145 cold drawn steel heat treated to 235-311 Brinell.

This characteristic in canned goods is hardly a problem; yet, the same characteristic in bar stock causes untold difficulty. Bars look alike; they are mixed in the storesroom and often are issued incorrectly to the machine shop. This one characteristic of bar stock is largely responsible for the money and time wasted on expensive physical and chemical analyses of unidentified metals. A great quantity of bar stock has to be discarded because of uncertain chemical content. Far too many finished and semi-finished parts end up in the scrap pile because of wrong steel used in their manufacture. Cut-off tools, drills, and cutting tools get ruined because of steel being issued incorrectly from the storesroom. These are but a partial list of the known damages caused by incorrectly identified bar stock. When consideration is given to difficulties and headaches that are caused unknowingly by wrong bar stock, the scope and importance of the problem becomes readily apparent.

It would seem that this same problem would be a factor in the marketing and use of canned goods. However, it is not. Seldom do you hear of a housewife opening a can of vegetable soup and being confronted by a stewed tomato. You seldom hear of canned goods being issued wrongly, or of canned goods losing their identity. The reason is elementary: canned goods are permanently identified by a label plus a stamp. If the label is washed off or becomes illegible, the stamp tells the contents of the can.

This double protection—labeling and stamping—can be applied to bar stock as well. This can be done simply and effectively by (1) painting both ends of the bars with identifying colors (thus, in effect, labeling the bars) and (2) stamping steel specifications on the surface of bars.

Painting Ends of Bars

Every user of bar stock should have an up-to-date chart listing the different types of metal carried in stock with an identifying color assigned to each. There are no satisfactory, ready-made color charts, nor can there ever be such charts, since every plant handles different types of steel and in a different manner. The range of steels is so great and the treatments given bars so varied that it is best for each plant to design its own color scheme, basing it solely on the plant's steel requirements and steel practices.

Before leaving this matter of standardization of color schemes, it might be pointed out that standards should be established for the colors themselves used in painting bar stock. As it is now, there are no standard colors used by mills, warehouses or factories. As a result, "red" in the mill may be a strange rust red, in the warehouse it may be a crimson red and in the individual plants it may

for Bar Stock . . .

By BENJAMIN MELNITSKY
Waterbury, Conn.

. . . Differences in plant requirements and practices make impossible the drafting of specific color codes. The author, drawing on his experience in a war factory in the Waterbury area, states the principles of metals grouping and color selection that apply generally. Stamping and other supplementary means of identification are also described.

be anything from a powdery, pastel red to a red with definite purple overtones.

Considering the matter of individual color schemes in the identification of bar stock, the following steps are suggested for establishing a color scheme or redesigning the plant's existing color schemes.

The first step, that of *planning*, is one in which the storeskeeper, purchasing agent, plant engineer, heat treat man, superintendent, and other individuals concerned with bar stock should have a voice in the matter. The logical way to plan such a color scheme is at a conference. There the storeskeeper can present a list of all bar stock carried in stock. To this list should be added all other steels that might be purchased in the near future: also all NE steels that might be used should be listed. In other words, all eventualities should be considered and a really complete list made up. Such a list will serve as an invaluable guide in the intelligent use of bar stock, for it reduces the welter of specification numbers to a few limited groups that are adaptable to the particular needs of the plant. If the list is a comprehensive one, there will be no difficulty when new types of metal are received. As is often the case where color charts list only the steel on hand, they must be revised whenever a new steel is received.

Each metal should be listed by specification number according to the manner in which it will be purchased. The list should include nonferrous metals, tool steels, stainless steel—in fact, all metal purchased in bar form.

Grouping Related Steels

The next step is that of grouping closely related steels and assigning a color to each group. The decision as to how to group steels should be based solely on engineering requirements, heat treat practices and general shop practices. In grouping steels it is always best to have as few groups as possible. Obviously, the fewer the groups, the less trouble will be encountered in all phases of bar stock. If similar steels such as AISI C1019 and C1020 are to be used interchangeably throughout the shop, there would be no point in grouping them separately. Similarly if AISI A4140, A4142, A4143, and A4145 steels are to be used interchangeably they should all be grouped together. If it has been found that the finish of a cold rolled bar is sufficiently different from the finish of a hot-rolled bar, so that the two do not become confused, there would be no point in grouping them separately. If plant experience shows that annealed, normalized, quenched, as-rolled and similarly heat-treated bars of the same specification number can be used interchangeably, they should all be grouped together. If steel such as AISI A4145 is purchased heat treated to a certain Brinell hardness range, it should not be placed in the same group as A4145 annealed. In general, all questions about the grouping and use of steel should be decided upon. When this is done, the list should be bracketed off into groups, and a color assigned to each group.

In selecting colors to be painted on the ends of the bar stock, the following choices are available: solid colors, two-color combinations, solid color with stripe and three-color combinations. The last two, though still used in some plants, have the distinct disadvantage of being hard to apply to bars, hence, they are of limited value to the ordinary user of bar stock. Of the first two, the solid color is of course the better. It is easier and faster to apply, especially on smaller diameters. It would logically follow that solid colors should be assigned to the most frequently used steels and to those steels having the largest percentage of small sizes.

In using solid colors, bright, clear colors should be chosen. The colors should be clearly discernible one from the other. The list of solid colors should be restricted to the following:

Red	Orange	Yellow	Green	Blue
White	Black	Gray	Brown	

In using two-color combinations, such combinations as red and orange, orange and yellow, and others that are adjacent on the spectrum should be avoided. Listed below are a group of legible two-color combinations:

Red and Yellow	Blue and White
Red and Green	Blue and Brown
Red and Blue	Blue and Gray
Red and Black	
Red and White	Black and White
Red and Gray	Black and Gray
Red and Brown	Black and Brown
Orange and Green	Yellow and Gray
Orange and Blue	Yellow and Blue
Orange and Black	Yellow and Black
Orange and White	Yellow and White
Orange and Gray	Yellow and Brown
Green and Black	
Green and White	Brown and White
Green and Brown	Brown and Gray
Green and Gray	

Nine solid colors plus 29 color combinations give a total of 39 colors that can be applied to 39 different groups of steels. If more than 39 groups are needed, which is seldom the case, the more expensive metallic colors of gold, silver and aluminum may then be used. If still more colors are needed, in-between shades such as pink, purple, violet, etc., could be used. However, the colors should be restricted wherever possible to the above-mentioned nine solid colors and the 29 color combinations.

A color should next be assigned to each group on the list as follows:

Red

C1015 cold drawn
C1015 hot rolled
C1019 cold drawn
C1019 hot rolled
C1020 cold drawn
C1020 hot rolled
C1022 cold drawn
C1022 hot rolled

Orange

C1040 cold drawn
C1040 hot rolled
C1042 cold drawn
C1042 hot rolled
C1043 cold drawn
C1043 hot rolled

C1045 cold drawn
C1045 hot rolled

Yellow

C1117 cold drawn
C1117 hot rolled

Green

A3140 cold drawn annealed
A3140 hot rolled annealed
A3141 cold drawn annealed
A3141 hot rolled annealed
A3145 cold drawn annealed
A3145 hot rolled annealed

Green and Black

A3140 cold drawn heat treated
A3140 hot rolled heat treated
A3141 cold drawn heat treated
A3141 hot rolled heat treated
A3145 cold drawn heat treated
A3145 hot rolled heat treated

In assigning colors to different metals, color can be used for the dual purpose of identifying the particular steel as well as indicating the broad classification of the metal. Thus, solid color can indicate low carbon steels; black and another color may indicate alloy steels purchased heat treated to certain hardness range; yellow and another color may be used to indicate all NE alloy steels that can be carburized. If ferrous and non-ferrous metals are stocked, the same color

Typical Color Schemes and Stampings for Bar Stock

SAE Number	Stamping	Color on Ends of Bars
X1020 cold drawn	X1020	Green
X1020 hot rolled	X1020	
1015 cold drawn	1015	
1015 hot rolled	1015	
1040 cold drawn	1040	Red and Blue
1040 hot rolled	1040	
1112 cold drawn	1112	Blue
1112 hot rolled	1112	
X1314 cold drawn	X1314	White
X1314 hot rolled	X1314	
2315 cold drawn	2315	Red and White
2315 hot rolled	2315	
2320 cold drawn	2320	
2320 hot rolled	2320	
3120 cold drawn	3120	Black
3120 hot rolled	3120	
3135 cold drawn	3135	Brown
3135 hot rolled	3135	
3140 cold drawn	3140	Red
3140 hot rolled	3140	
3140 C.D.H.T.[2]	3140+	Red and Black
3140 H.R.H.T.	3140+	
4042 cold drawn	4042	Silver
4042 hot rolled	4042	
4050 cold drawn	4050	
4050 hot rolled	4050	
4145 cold drawn	4145	Orange
4145 hot rolled	4145	
4145 C.D.H.T.[2]	4145+	Orange and Black
4145 H.R.H.T.	4145+	
4340 cold drawn	4340	Gray and Blue
4340 hot rolled	4340	
4340 C.D.H.T.[2]	4340+	Gray and Black
4340 H.R.H.T.	4340+	
4615 cold drawn	4615	Yellow
4615 hot rolled	4615	

NE Steel Number	Stamping	Color on Ends of Bars
NE 8642 cold drawn or hot rolled	NE8642	Orange and White
NE 8649 cold drawn or hot rolled	NE8649	
NE 8642 C.D.H.T. or H.R.H.T.[2]	NE8642+	Green and White
NE 8649 C.D.H.T. or H.R.H.T.	NE8649+	
NE 8744 cold drawn or hot rolled	NE8744	Orange and Brown
NE 8749 cold drawn or hot rolled	NE8749	
NE 8744 C.D.H.T. or H.R.H.T.[2]	NE8744+	Green and Brown
NE 8749 C.D.H.T. or H.R.H.T.	NE8749+	
NE 9442 cold drawn or hot rolled	NE9442	Orange and Silver
NE 9445 cold drawn or hot rolled	NE9445	
NE 9450 cold drawn or hot rolled	NE9450	
NE 9442 C.D.H.T. or H.R.H.T.[2]	NE9442+	Green and Silver
NE 9445 C.D.H.T. or H.R.H.T.	NE9445+	
NE 9450 C.D.H.T. or H.R.H.T.	NE9450+	
NE 9540 cold drawn or hot rolled	NE9540	Orange and Gray
NE 9540 C.D.H.T. or H.R.H.T.[2]	NE9540+	Green and Gray
NE 8442 cold drawn or hot rolled	NE8442	Orange and Red
NE 8447 cold drawn or hot rolled	NE8447	
NE 8442 C.D.H.T. or H.R.H.T.[2]	NE8442+	Green and Red
NE 8447 C.D.H.T. or H.R.H.T.	NE8447+	
NE 8615 cold drawn or hot rolled	NE8615	Yellow and Blue
NE 8620 cold drawn or hot rolled	NE8620	
NE 9415 cold drawn or hot rolled	NE9415	Yellow and White
NE 9420 cold drawn or hot rolled	NE9420	
NE 9422 cold drawn or hot rolled	NE9422	
NE 8715 cold drawn or hot rolled	NE8715	Yellow and Brown
NE 8720 cold drawn or hot rolled	NE8720	
NE 8024 cold drawn or hot rolled	NE8024	Yellow and Red
NE 8022 cold drawn or hot rolled	NE8022	

Tool Steels

Tool Steels	Stamping	Color on End of Bars
Stentor tool steel	STENT	Gray
Rex AAA tool steel	REX AAA	Gray and Red Stripe
Rex AA tool steel	REX AA	Gray and Black Stripe
Rex MM tool steel	REX MM	Gray and Brown Stripe
Comet tool steel	COMET	Gray and Yellow Stripe
Supremus H. S. tool steel	SUPER	Gray and Orange Stripe
Moly. H. S. Mogul tool steel	Moly-M	Gray and Blue Stripe
Moly. H. S. Tem. tool steel	Moly-T	Gray and Green Stripe

Non-Ferrous Metals

Non-Ferrous Metals	Stamping	Color
No. 2 Bronze—cast and rough turned	#2	Yellow
No. 4 Bronze—cast and rough turned	#4	Blue
46M6 Bronze—cast and rough turned	#6	Green
46B8 Bronze—cast and rough turned	#8	Gray
No. 5 Bronze—cast and rough turned	#5	Red
Brass rod	BR	Black
46B15 extruded bronze	46B15	White
Tobin bronze	TBN	White and Red
No. 314 Amer. Brass phosphor bronze	#314	Orange
Everdure bronze	EVD	Orange and Blue
Soft copper tubing	unstamped	and unpainted
Cast iron	unstamped	and unpainted

NOTES ON BAR STOCK COLOR SCHEME. (1) Such terms as cold drawn annealed, cold drawn as drawn, cold drawn normalized, etc., have all been included under the one grouping of "cold drawn." Similarly, hot rolled annealed, hot rolled as rolled, hot rolled normalized, etc., have all been included under the one grouping of "hot rolled." (2) Through-hardening steel purchased already heat treated have been designated as C.D.H.T. or H.R.H.T., the former for cold finished stock, the latter for hot rolled stock. (3) In setting up this color scheme, the colors have been used to indicate the type of steel: (a) Black and another color signifies heat-treated SAE steel. (b) Green and another color signifies heat-treated NE Steel. (c) Yellow and another color signifies case hardening NE Steel. (d) Orange and any other color except black signifies through hardening NE steel purchased *not* heat treated. (e) Same colors have been used on nonferrous metals as have been used on certain steels because the color of the two metals distinguish them. (4) Even though tool steels are kept in separate buildings, it was thought wise to assign an entirely new color scheme to tool steels.

may be assigned to both types of metal. The appearance of the two metals is distinctive enough to warrant the use of the same color for both.

Using the Color Chart

Once the color chart has been designed, copies should be mimeographed or printed and distributed to all who can use them. Every color chart that is distributed should be accounted for, so that if changes or revisions must be made, all copies can be changed. There is great danger in using outmoded color charts in one department and up-to-date charts in another. Color charts can serve many useful functions. They limit the purchasing department to a select number of steels, thereby simplifying the task of purchasing steel and eliminating the danger of having many odd types of bar stock kicking around the steel room. In the machine shop the chart can be a great aid to the foremen and machinists in selecting the right steel for the job. Many plants require inspection of paint on the ends of bars before they are machined. In the storeroom the chart should be the sole guide to the selection of steel to be pulled for orders.

Charts should be posted conspicuously in the steel room and all personnel handling steel should be thoroughly familiar with the colors. They should also be posted in the shipping room to help sort out steel being shipped to sub-contractors or outside purchasers. In this connection, whenever steel is shipped from the plant, the colors on the ends of the bars should be noted on all shipping papers. Color charts are useful in the receiving room as an aid in correctly identifying shipments of bar stock. In this connection, purchase orders for bar stock may specify that ends of bars be painted by vendor.

In using and ordering paint, since there are no standard individual colors used in painting bars, paint should be ordered on the basis of a brand name as well as the brand color name and color number. If paints are mixed in the plant, definite formulae for mixing the paints should be followed. Consideration should be given to the conditions under which the bars are stored. Bars in outside racks require paint that does not chip, peel or discolor under the elements.

In selecting colors, consideration should also be given to the existing lighting conditions in the steel room, as certain lights tend to distort colors. This is especially important where there are both day and night shifts in the steel room. One shift will view the paint under daylight, the other under distorting artificial light.

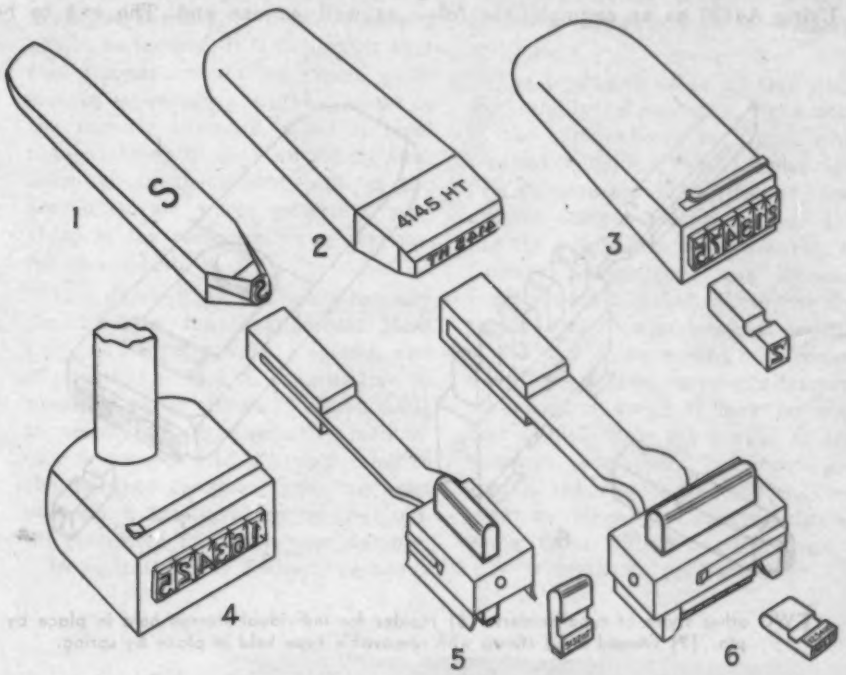
Since identity is best known when bars are received, it is at this time that identity should be made permanent. Hence, all bars should be painted as soon as they are received in the steel room. Bars should be painted even if they are going into the shop for immediate processing. This is important because unless bars are painted, they may be used on the wrong jobs. If the job is cancelled or the quantity reduced, the bars may be incorrectly identified when they are returned to the storesroom.

Even if the bars have been painted by the vendor, they should be repainted when they are received. This should be done because painted ends often become discolored in transit. Usually the vendor's paint will be entirely different from the paint used by the plant receiving the bar stock. In any event, the bars should be painted on *both ends*. One of the ends should be painted while the bars are still on the floor, the other end when the bars are in the rack. In this way, the unpainted end will face out as the bars are being pushed into the rack, and the painted end will not be smudged. Once the bars are in the rack, the unpainted end can then be painted.

After the bars are cut, the cut end should be repainted before the bar is replaced in the rack. If this is done consistently, all bars leaving the storesroom will have at least one end painted.

Cans of paint and clean brushes should always be readily accessible. Trays to carry several cans of paint with a clean brush for each can of paint can be designed.

A note of caution should be appended hereto. If bars are to be used on automatic screw machines, care should be exercised in painting only the ends. If there is paint along the sides of the bars, the bars may not fit into the collet chucks.



TYPES of stamps used to identify bar stock. (1 Individual stamp best used where single symbol is used to identify bar stock. Such stamps are also made to be used with wood or wire holders. (2) Forged hand stamp with markings on stamp itself. Such stamps also are made with openings for wire or wood handles. (3) Forged hand stamp with removable type held in place by pin. (4) Ax-type stamp with removable type. This stamp is swung against the bar, the force of the swing causes the impression on the steel. (5) Two types of steel stamps with handles. Stamp with characters fits into holder and is held in place by pin.

Stamping Bar Stock

Stamping is the other step that must be taken to insure permanent identification of bar stock. It may at first seem unnecessary to stamp *and* paint bars; actually such is the case. The extra time required to stamp bars is fully compensated for by the fact that once a bar is stamped, its identity is known after both ends have been cut off, even after there has been preliminary machining on the bar.

As with everything else, stamping of bars can be done best only if there are definite procedures that are followed consistently by those in the steel

room. At the same time as the color scheme is decided upon at the conference, written procedures for stamping bars should be drawn up. The procedures should cover the following:

1. *What to stamp*—No matter how steels are grouped, no matter how many different specification numbers are designated by one color, bars should always be stamped with the exact specification number. Thus, even though AISI A4140, A4142, A4143, A4145 steels are all painted orange, the bars should be stamped with the exact specification number. Using A4140 as an example, the following are but a few ways in which a bar of this steel may be stamped:

4140	Specification number alone.
4140 CDA	Specification number plus abbreviations to indicate finish of bars as well as treatment given bars.
4140*	Specification number plus symbol which signifies cold drawn annealed.
#	Symbol which signifies 4140 cold drawn annealed.
BVX	Cold wherein B means 4140, V means cold drawn, and X means annealed.

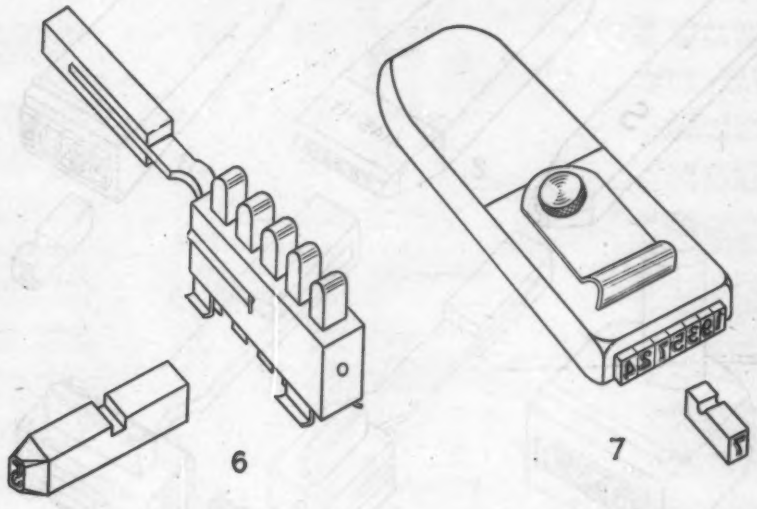
The manner in which bars are to be stamped is a matter of individual company choice. Such choice being made solely on the basis of company practices and individual plant problems.

2. *When to stamp*—Bars should be stamped as soon as their exact identity has been established. Bars should be stamped at the same time as they are being painted.

3. *Where to stamp*—Bars should be stamped along their length in the following manner: Hot rolled bars—the surface of which will be completely machined, should be stamped at least every 2 ft. along the length of the bar. Cold-rolled or ground and polished bars—where the surface may be marred by a stamp mark, both faces of the bar should be stamped as well as one end. The end to be stamped can be the end that will be chucked when the bar is on the lathe. If the cold-rolled bar is so used that the stamp mark will not affect the finished part, the bars should be stamped at least every 2 ft. along the length of the bar. In this connection it might be noted that several companies stamp the steel specification number on all finished parts. This information is helpful if parts have to be reordered or if parts are to be replaced in the factory using the product.

4. *How to stamp*—Handles should be provided for bar stock stamps in order to protect the hands of the person who is to stamp the bars. In most cases stamps can be purchased with handles, or handles can be improvised from wood or wire. In stamping the bars, the bars should be spread out on a firm, flat surface. Facing the bars, the person doing the stamping should start with the bar furthest from his body and work toward his body. This method is faster than stamping bars individually along their length.

5. *Type of stamps*—In Figs. 1-7 are shown the many types of stamps that are adaptable to bar stock.



TWO other styles of type holders: (6) Holder for individual stamps held in place by pin. (7) Forged hand stamp with removable type held in place by spring.

Identifications

Painting the ends of bars and stamping the bars as outlined above are the two primary means of maintaining identity of bar stock. There are, however, supplementary means of identifying bar stock. Individual company problems may warrant the adoption of any of the below-listed steps *in addition* to stamping and painting ends.

1. On larger diameters—the size of the bar, the type of metal, and other information can be stencilled or painted on the face or along the sides of the bars.

2. Sides of bars may be painted or sprayed with the identifying color or colors. If the ends of the bars are cut off inadvertently, or become discolored, the identifying color is still on the sides of the bar. This method is not adaptable to cold-rolled bars. On hot-rolled bars it may present a heat-treat problem if the bars are not machined preliminary to heat treating.

3. Special chalks for marking bar stocks are available. Specification numbers, heat numbers, size, or similar information can be printed legibly on bars with such chalk.

4. Colored decalcamanias can be used instead of paint on the ends of bars. A great variety of color schemes can be had; however, their main disadvantage is their tendency to peel off after a while. Decalcamanias are hard to apply on greasy or oily bars.

5. Labels containing all desired information can be pasted on bars and protected with a coat of shellac.

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Pressure Sensitive Control of Furnace Dampers

ALTHOUGH the extensive application of automatic temperture control of all phases of industrial heating equipment has made it more than ever necessary to ensure the maintenance of constant draft conditions in industrial furnaces, the regulation of stack dampers by automatic means has so far only been achieved by what at best may be termed compromise methods whereby the draft conditions are controlled within rather wide limits by means of a mechanically operated butterfly valve actuated by the automatic temperature control equipment.

It is, nevertheless, a well-known fact that the fine adjustment of a furnace damper plays an important part in the maintenance of correct atmosphere conditions within the furnace chamber, and such adjustment should be made not in terms of furnace temperature, but in terms of pressure, and in fact the skilled operator today will make his damper adjustment on the basis of the behavior of the flame of a lighted match held to the spy hole of the furnace door.

If maximum protection is to be given to the work under treatment, the operator will close his damper until there is a very slight positive plenum inside the furnace working chamber, thereby avoiding the influx of cold air which would damage the work and incidentally lower the efficiency of the furnace.

In the modern natural draft underfired gas furnace, if the best results are to be secured, it is important that the damper should be closed sufficiently to ensure a slight plenum in the furnace chamber, while it must not be closed to such an extent that there is an insufficient pull at the secondary air inlets generally provided in the recuperative system under the hearth.

The damper control unit recently developed by the Incandescent Heat Co., Ltd., Birmingham, England, and illustrated in Fig. 1, is sensitive to pressure variations of less than 0.001 in. water. An ultra sensitive manometer is connected by a pressure leg to the furnace chamber, and this unit operates a fractional horsepower motor connected to the furnace damper.

In operation the damper responds positively and instantly to any pressure variation in the furnace chamber from whatever cause and even a shop draft, or change of barometric conditions, will immediately be taken care of. In the case of furnaces fitted with automatic temperature control, a reduction of gas or air supply will immediately lead to a corresponding alteration of the damper settings.

The practical value of this device can readily be measured by a study of the curve shown in Fig. 2 which was taken from a CO_2 recorder fitted to a furnace provided with the Incandescent damper control system. During the run shown by this curve, the furnace temperature was increased from 600 to 850 deg. F. in the first period, and then maintained constant at 850 deg. F. by means of a conventional on-off type automatic temperature control unit. It may be noted that only during the period of temperature variation, but above all, during the period at constant temperature when the gas supply was going from full-on to turn-down at

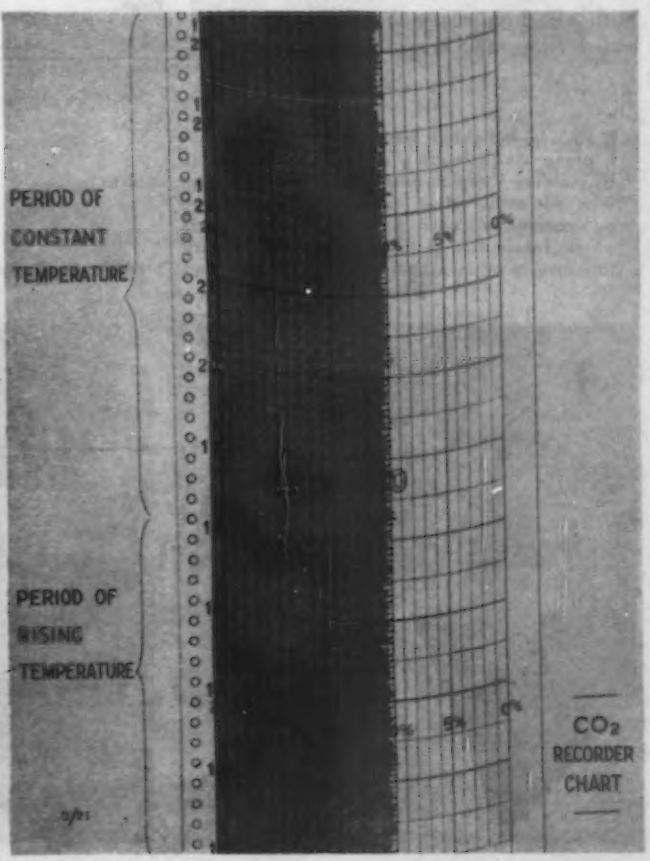
(CONTINUED ON PAGE 130)

BELOW

FIG. 1—Temperature control unit incorporating a pressure damper control mechanism and temperature indicating and recording instruments, as applied to a small heat treatment furnace.

RIGHT

FIG. 2—Section of a chart taken from a CO_2 recorder fitted to a furnace provided with pressure sensitive damper control system. Within practical limitations the CO_2 curve may be regarded as a straight line.



A High-Strength Plastic Laminate

. . . A plastic laminate made of cellulose or Fiberglas fibers and impregnated with a thermosetting resin has been developed at Consolidated-Vultee. This material with a specific gravity of only 1.64 has a maximum tensile strength of 120,000 lb. per sq. in. and a compressive strength of 56,000 lb. per sq. in. Although high in cost, its use in intricate aircraft parts saves time, tools and labor.

CONOLON, a new low-pressure plastic laminate developed for Consolidated Vultee Aircraft Corp. for the fabrication of airplane parts is said to be stronger and lighter than similar aluminum alloy parts. Three types of the material are being made, each comprising a fiber impregnated with a thermosetting resin. Type C is reinforced with high-strength cellulose fibers; type F employs extremely fine filaments of Fiberglas, and type "FC" is a combination of the first two types. The laminating resin used in connection with all three types has been designated N13p, and is produced by combining thermoplastic and thermosetting resins.

Physical Properties of Conolon

Maximum modulus of elasticity, lb. per sq. in.	4.7×10^6
Maximum tensile strength, lb. per sq. in.	120,000
Maximum compressive strength, lb. per sq. in.	56,000
Specific gravity	1.64
Curing pressure, lb. per sq. in.	10–15
Curing temperature, deg. F.	275–500
Curing Time at 400 deg. F., min.	10
Resistance to ordinary acids, alkalies, and solvents	Good
Resistance to water, oils, and cutting compounds	Good
Maximum Rockwell hardness (M-scale)	110
Maximum impact resistance (edgewise), ft.-lb. per sq. in.	126
Ultimate bearing strength, lb. per sq. in.	82,000
Resistance to vibrations	Excellent
Normal Color	Orange
Finish	Smooth, glossy

Both Fiberglas and Fortisan fabrics have been used as received from the mills in making Conolon laminations. However, if it should become contaminated with grease or dirt, the cloth should be thoroughly dry-cleaned with a good naphtha-type solvent before it is used.

The fibers are impregnated by passing the fabric through a bath of the N13p resin, which is usable at room temperatures, and between two rubber squeegees, which remove excess resin. Then the material is air dried for 24 hr., or oven dried for 20 min. at 140 deg. F. When oven drying is used, the fabric should be suspended so that it will not wrinkle, sag or be subjected to dust or moisture.

The procedure followed in laminating Conolon moldings varies in accordance with the nature of the parts to be fabricated and the stresses to which they will be subjected. The fabric fibers may be placed parallel or at

FIG. 1—Indicated here is part of an airplane wing's leading edge which was made by molding Conolon plastic laminate. Although it is currently rather expensive, Conolon can be economically used to make contoured parts where fabrication with metals would necessitate excessive investments in time, tools and labor.

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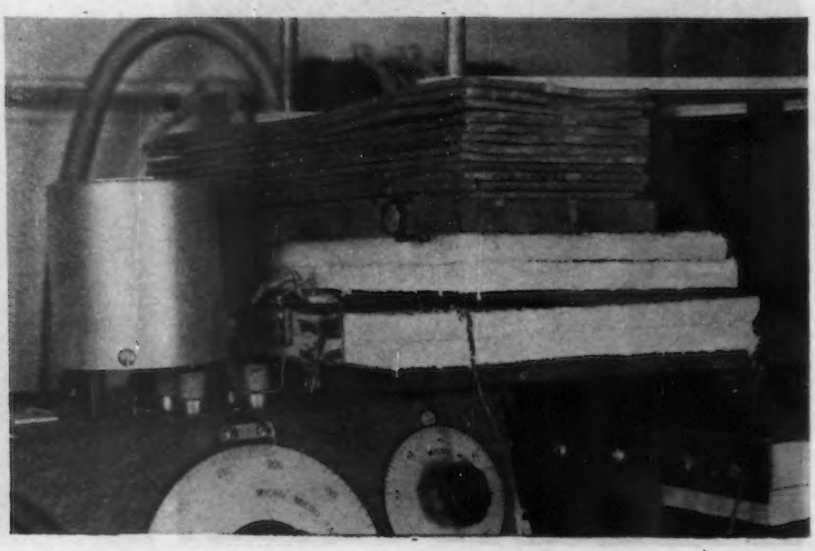
FIG. 2—Conolon laminations being experimentally cured with radio frequency heating equipment.



an angle to one another. Curing may be accomplished either in a vacuum bag or in a hydraulic press at a pressure of 10 to 15 lb. per sq. in. and a temperature of 300 deg. F. (+25 or —10 deg.) for approximately 30 min., depending on the thickness of the laminate.

Good Conolon laminations are obtained by observing the following precautions:

(1) The fabric must contain the correct amount of resin to produce a finished laminate containing 33 ±7 per cent solid resin for Conolon C and 27 ±7 per cent for Conolon F.

(2) The resin-impregnated fabric must be stored in a sealed container at a temperature of approximately 75 deg. F. when it is not to be used immediately. In no case should the impregnated fabric be stored longer than one month or at temperatures of more than 75 deg. F.

(3) Extreme care must be exercised in building up laminates to see that the fibers are laid in the proper direction, because the unidirectional Conolon fabrics have 100 per cent of their strength concentrated in one direction so that any error in laying up the cloth will result in a seriously weakened product.

(4) Excessive temperatures must be avoided in curing the C and FC types of Conolon.

(5) The molds must be designed to withstand the pressures involved in curing Conolon. Although they are comparatively low, such pressures may constitute a very large total force which will cause distortion on sizable molds.

High Frequency Curing

A series of tests were recently made to determine whether Conolon laminations could be cured by means of high frequency heating. Good results were obtained, although the tests were not exhaustive, and it now seems possible that Conolon airplane parts will eventually be mass produced with radio frequency equipment.

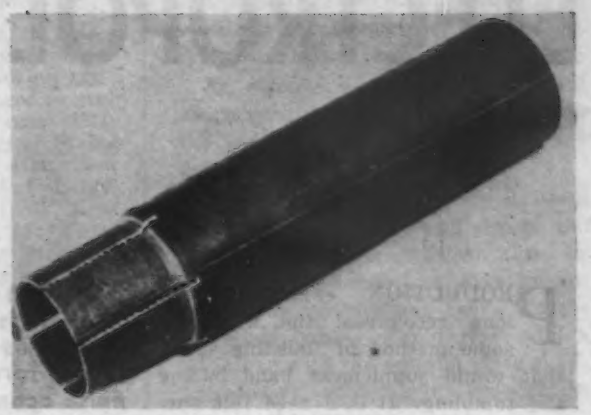


FIG. 3—This round and slotted tube was fabricated as a single unit by molding Conolon. It is said to withstand considerably more vibration than will a similar duraluminum part.

Despite the fact that it has a specific gravity of only 1.64, Conolon can develop maximum tensile and comprehensive strengths of 120,000 and 56,000 lb. per sq. in. respectively, and a maximum modulus of elasticity of 4.7×10^6.

The cost of Conolon is currently rather high, ranging from $1.58 to $3.93 a sq. yd., depending on the desired thickness; and, for this reason, the new material is being used only for the fabrication of the more intricate airplane parts, such as ducts and contoured wing surfaces, since metal construction would require excessive investments in time, tools and labor. When the cost of Conolon components has been reduced, it is possible that the laminate will be used to fabricate entire airframes.

Because it has tremendous resistance to vibration, Conolon is particularly desirable for the construction of airplane parts. In a recent test, the trailing edge overflap of a Liberator B-24 wing was molded from Conolon and placed on a vibrating table. Although the laminated part was lighter than a similar aluminum part, the overflap showed no signs of failure after 55 hr. of testing.

Most plastic laminates have an undesirable tendency to absorb moisture and deteriorate when subjected to salt water and various other liquids. Conolon specimens have been immersed in salt water, benzene, aromatic fuels, and acetone for periods ranging from 24 to 48 hr. without signs of deterioration.

Metal and fabric airplane wings lose a certain amount of efficiency after prolonged periods of operation, due to scratches and mars made by small stones and other debris which are encountered while taking off or landing. Conolon wing surfaces are not subject to this loss, being able to withstand an impact of 120 ft-lb. per sq. in.

In most chemical and physical properties, type F is slightly superior to the other types of Conolon. However, the C type is frequently used because of its extreme stiffness. The FC type, representing a compromise, has some of the good properties of both the F and C types.

Iron Ore Concentrated by Flotation Methods

IN view of the ultimate depletion of the high grade Lake Superior ores and the need for beneficiating those of lower grades which are in such abundance, significance is attached to a recent patent, No. 2,364,778, issued to E. H. Brown and F. X. Tartaron for froth flotation methods of concentrating ores. This patent describes methods of concentrating finely divided oxidized iron ores in which the gangue ingredient is principally quartz. This consists in treating an aqueous pulp of such an ore with an anionic collecting agent. Included in suitable agents for this purpose are the soaps of high fatty acids or of resin acids. Cooperating agents, like lime and acid-treated starch solutions, are also used. Ore pulp thus treated is subject to froth flotation and the silica-containing froth is removed, thereby producing in the pulp residue a concentrate rich in iron oxide.

ELECTROPOLISHING

Of Stainless Steels

. . . With resumption of consumer goods in prospect by late fall, interest is being aroused once more in creating good appearance as well as utility in metal products. Electropolishing of metals blossomed forth about five years ago as a method of obtaining a bright finish economically, but had to be put in the trunk, pending better days. Rustless Iron & Steel Corp. is promoting on a license-free basis a citric-sulphuric acid process described herewith, and stands ready to loan bench type apparatus for trial processing of postwar goods made of stainless steel.

PRODUCTION engineers have long recognized the need for some method of finishing metal that would supplement hand buffing and tumbling. It is a need felt particularly acutely where a high polish is desirable on complex welded wire articles. Mechanical polishing of these products was in many cases an impossibility and even when possible generally very costly.

This need was met in a definitive and practical way by the Rustless Iron & Steel Corp. of Baltimore, in whose laboratory was devised an exclusive process for electropolishing stainless steels. That was more than five years ago, and the process is now patented. Since that time electropolishing has left the research laboratory and established itself as a commercial process in daily use.

With it, the production of stainless steel wire assemblies—refrigerator trays, for example—has been economically possible, for the Rustless solution not only brightens and beautifies stainless steels, but it also enhances their corrosive resistance as well. It accomplishes the latter by both removing the discoloration and sometimes hidden weld scale formed during the welding operation, and by highly passivating the polished metal.

The removal of weld scale by electropolishing is particularly important since other methods of removal such as acid pickling will etch the finish. Then too rusting may develop under conditions of high humidity where weld scale is present. Thus, it may be said that the production of refrigerator shelves from stainless steel wire was made possible by the Rustless process which removed the weld discoloration and improved the cold drawn finish.

Rustless licensed its solution to two wire forming companies which produced the stainless steel shelves featured in the prewar deluxe refrigerators. In the course of five years' use as a production tool, however, it has been learned that electropolishing is not limited to finishing complex wire forms alone. A valve manufacturer, troubled because his forged stainless steel valve body had a dull finish when descaled and tumbled, sent it to Rustless for advice on finishing. When descaled and electropolished, it was quite satisfactory and improved the

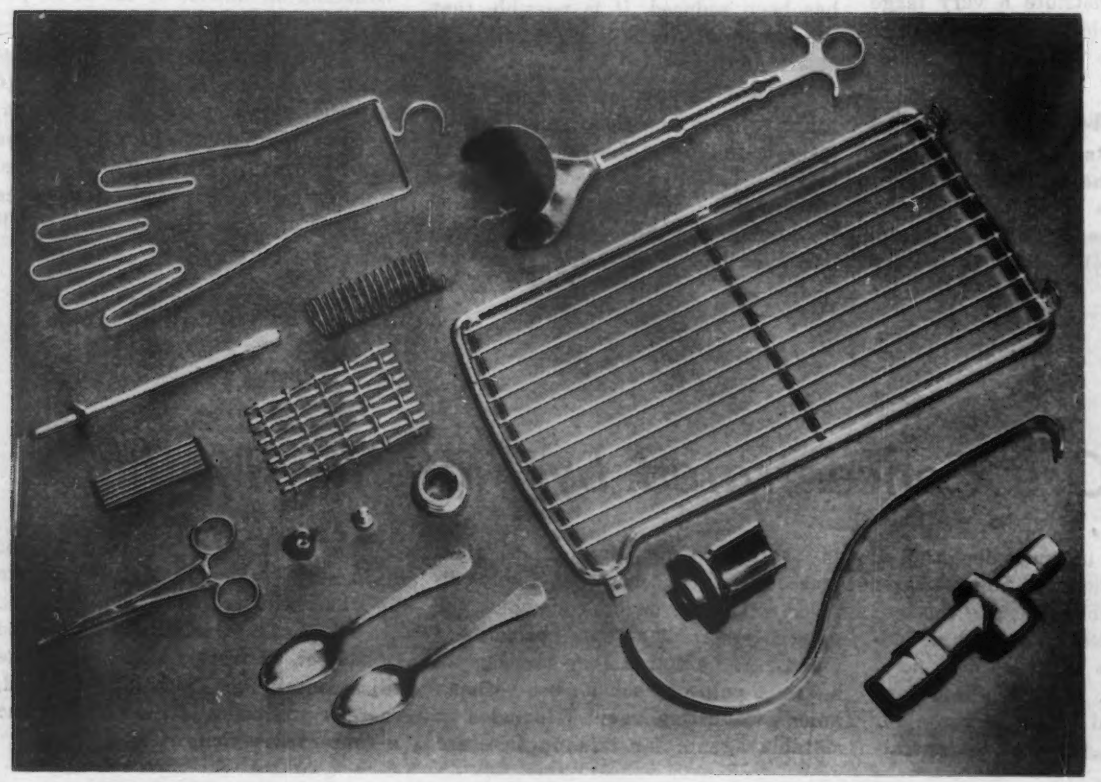


FIG. 1—Improved corrosion resistance is an important advantage for electropolishing the variety of products shown here.

serviceability and saleability of his product.

This finishing process has been used, although secondarily, to deburr stainless steels. Since it removes a metal film from the processed work ranging from 0.0005 to 0.001 in. on the overall diameter, it will round off small burrs. It is generally cheaper, however, to deburr stainless steels mechanically.

Electropolishing might be considered the reverse of electroplating, greatly simplified. Briefly, the piece to be polished becomes an anode instead of a cathode as in electroplating. When immersed in an acid bath of predetermined constituents, direct current is applied and a minute film of metal on the surface literally flows off, brightening the work.

There are a number of electropolishing processes, varying according to the acid solutions used. These mixtures may be sulphuric and citric acids; phosphoric acids and certain alcohols; sulphuric and hydrofluoric acids; sulphuric and phosphoric acids; and phosphoric acid and glycerine.

Nearly all of these solutions, however, have been under a cloud of patent interference which has only cleared recently, delaying somewhat their commercial applications. The Rustless solution of citric and sulphuric acids is an exception. Patent-clear, it was a commercially used process before Pearl Harbor.

Electrolyte Selected

The Rustless electrolyte solution is comprised of 55-60 per cent citric acid, 15-20 per cent sulphuric acid and 20-30 per cent water. After a variety of others had been explored, it was selected by the research staff because of ease of control, practical working range and absence of noxious fumes. It was found also that the metal film flowing off the anode precipitated and sank to the bottom of the treatment tank in the form of sludge or mud that could be readily removed.

This precipitation gave the Rustless process one of its outstanding characteristics—an all but infinite life, reducing ultimate costs. In the two above mentioned plants fabricating complex wire forms and using the Rustless process for electropolishing it has never been necessary to dump the solution. The heavy precipitate of metal salts gradually built up on the bottom of the tank is easily removed by dipping it out. Chemical balance of the solution is maintained by addition of sulphuric acid and water, citric acid needing replacement only to compensate for dragout.

FOR additional data on electrolytic polishing, the reader is referred to the following articles which have appeared in previous issues of THE IRON AGE: "Electrolytic Polishing of Stainless Steel" by G. Kiefer, Dec. 21, 1939, p. 30; "Pickle Polished Stainless Steel" by T. W. Lippert, Jan. 11, 1940, p. 22; "Comments on Electrolytic Polishing of Metals" by H. Pray and C. L. Faust, April 11, 1940, p. 33; "Pickling and Polishing of Metals" by S. Tour, May 23, 1940, p. 56, May 30, 1940, p. 26; "Electropolishing — a Symposium on Today's Practice" by T. W. Lippert, Dec. 26, 1940, p. 23, and "How to Electrolytically Polish Metals for Metallographic Examination" by F. Keller, Jan. 9, 1941, p. 23.

The treatment tanks, varying in size depending upon the form to be electropolished, are lead-lined steel or wood. Copper is used for the cathodes because of its high electrical conductivity and long life in the electrolyte and also because no insoluble salts build up on its surface, as they do, for example, on lead.

An electric immersion heater with thermostatic control is used to obtain the operating temperature of 190 deg. F.

The type of work rack to be used depends on the shape and size of the parts to be electropolished. Two or more separate contacts may be required. Supplementary tanks include a reclaim rinse, a cold rinse and a hot rinse with the reclaim rinse available for replenishing the evaporation loss in the treatment tank.

Current density varies, generally ranging from 0.5 to 1 amp. per sq. in. of surface metal. It is seldom necessary to go beyond the use of 6-8 volts, with the treatment time depending directly on the original surface of the parts to be electropolished. Time of treatment varies as a rule from 5 to 10 min.

Cost Factors

It is difficult to estimate the cost of installing the Rustless citric-sul-

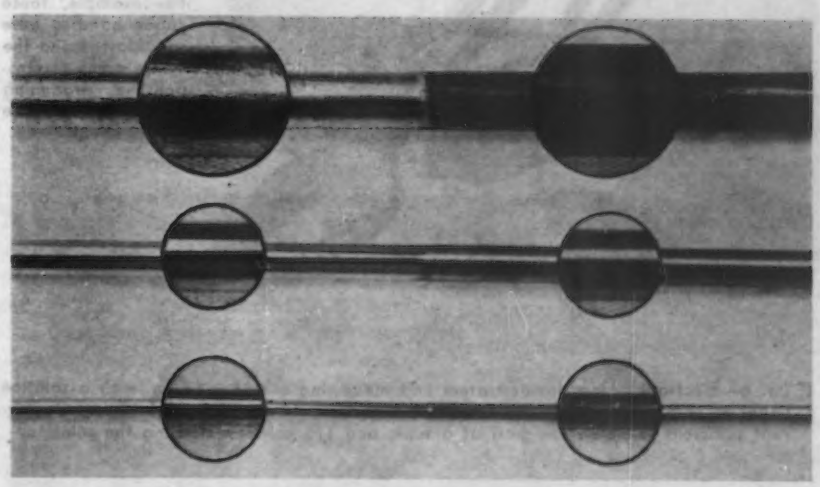


FIG. 2—(top) Hot rolled or forged and pickled surfaces are brightened but not rendered smooth (Specimen ½ in. round, Rustless 12, AISI Type 410). (middle) Effects of coarse grinding (80 grit or coarser) are not quickly erased by electropolishing. (Specimen 0.310 in. round, Rustless 18-8, AISI Type 304). (bottom) Cold drawn wire especially in smaller sizes can be brightened very satisfactorily. (Specimen 0.154 in. round, Rustless 17, AISI Type 430).

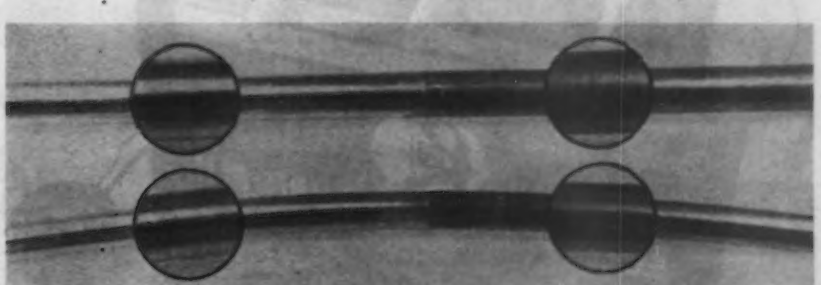


FIG. 3—Effect of cold drawn surface quality. (top) Commercial cold drawn wire especially in larger sizes shows slight frosting after normal electropolishing treatment. (Specimen ⅜ in. round, Rustless 18-8 AISI Type 304). (bottom) Specially processed cold drawn wire yields full glistening finish after electropolishing. (Specimen is 0.306 in. round, Rustless 18-8, AISI Type 304.)

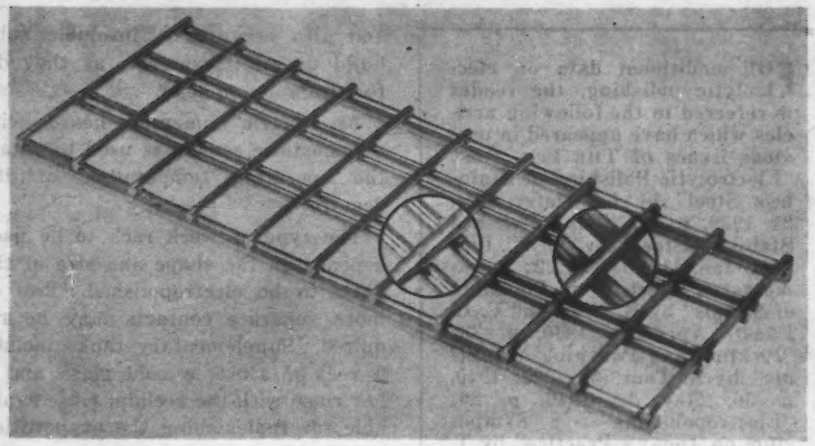


FIG. 4—Part of this resistance welded stainless steel wire form has been electropolished; other portion shows weld discoloration which was completely removed by this process.

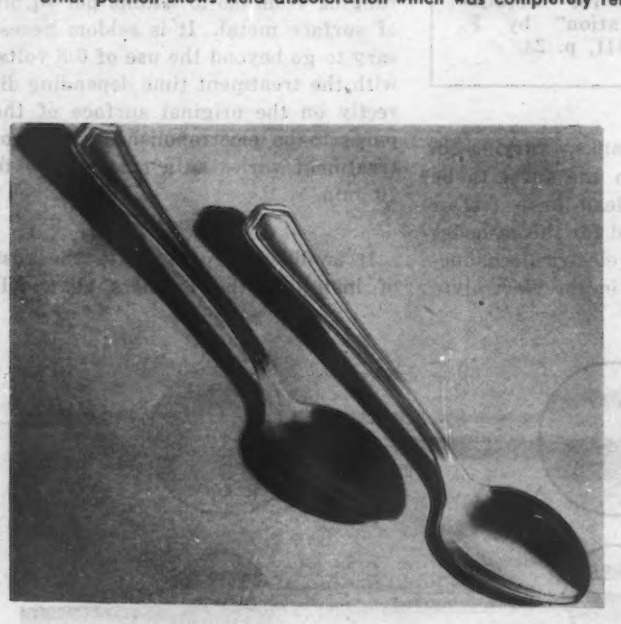


FIG. 5 — Unusual effects can be obtained with combinations of finishes. For example, these spoon handles were sandblasted and the entire piece electropolished, producing a pleasing two-tone effect.

FIG. 6—Electropolishing demonstration unit measuring 6 x 18 x 12 in., with a solution capacity of 5 gal., is fully equipped and requires only a source of 6-12 volt dc current sufficient to polish one part at a time, and 110 volts for heating the solution.

phuric process because the cost varies with the individual installation. The electrolyte itself, when mixed, costs approximately $1.35 per gal. The basic equipment needed is already commonly used in many plants where electroplating is done, and it can be easily converted to electropolishing.

Some idea of the costs involved might be gained from assessing the amounts paid for the installations in the two wire fabricating plants mentioned above. The treatment tanks in these plants are 33 ft. long, 5 ft. wide and 3 ft. deep. Each complete installation cost $40,000—$6,000 of this amount for chemicals and the balance for equipment including the motor-generator set. These are large semi-automatic units, and for many articles much less expensive batch type tanks can be used.

The problem today is to evaluate the electropolishing method as a production tool. It is obvious that the first cost of installation is much higher than tumbling or buffing equipment but the results are different. It will make high finishes available on parts which before could not be finished; it can be combined with mechanical finishing to improve results or reduce costs, or may replace hand finishing on some parts. Finishing methods vary greatly with the part and it is not easy to generalize, but it is easy to try out electropolishing on individual parts and determine its suitability.

As shown in the accompanying photographs, electropolished metals are bright and lustrous. They are smoothest when the original base finish is smooth. The polishing in the process of removing discoloration and irregularities of surface makes the metal appear even smoother. Finished refrigerator shelves are a good example.

If on the other hand, as in the case of the forged valve, the base finish is rough, the polish does not eliminate the surface irregularities; nevertheless it brightens the metal and the appearance is pleasing. Furthermore any surface seams or defects are accentuated, facilitating inspection.

The Rustless citric-sulphuric process is no cure-all, however. It can replace machine polishing, as it does in the case of the complex wire forms, or it can supplement hand buffing and tumbling, combining with the two to produce startling effects.

It is in no sense a descaling process, but rather a production tool which can be utilized as the designer or engineer sees fit. To illustrate: One novel technique has been to sand-

(CONTINUED ON PAGE 130)

New Equipment . . .

Power Transmission

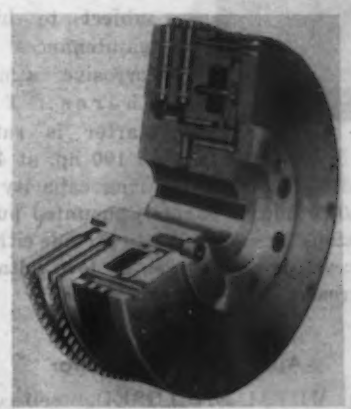
. . . Bearings, clutches, brakes and belting for mechanical power transmission are described, together with electrical power control apparatus.

TYPE E Dodge-Timken bearings are now available in both pillow blocks and flanged units from the *Dodge Mfg. Co.*, Mishawaka, Ind. This line of bearings is designed to give 30,000 hr. or more of life under normal service conditions as determined by use of standard selection tables. On each end of the extended inner race is a steel collar having two headless set screws placed 120 deg. apart and extending through clearance holes in the inner race to the shaft. These four set screws prevent rotation of the inner race on the shaft. Simple

labyrinth seals prevent loss of lubricant and protect bearings against damage from dirt or moisture. The bearings are completely assembled and lubricated at the factory.

Air-Actuated Disk Clutch

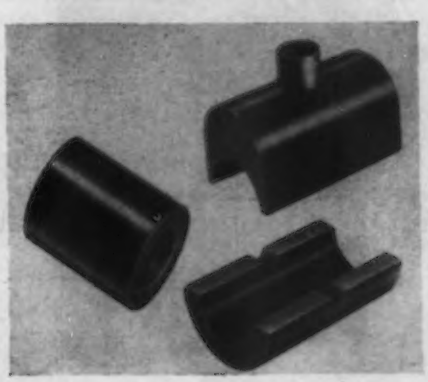
A MODEL P air-actuated clutch, suitable for remote control setups and where "feather-touch" engagements in heavy-duty operations are necessary, is announced by the *Twin Disc Clutch Co.*, Racine, Wis. It retains many of the features of the heavy-duty Twin Disc Model E (friction) clutch in that it has a hub and back plate, center plate, floating plate and friction disk of essentially the same proportions as the Model E. It is manufactured in a wide range of sizes, from 14 to 36 in. and capacities, 65 to 895 hp. The air-actuated clutch operates by remote control without a linkage system and shaft space is thereby greatly reduced. Any amount of air-pressure—within limits—can be



applied to the friction plates to provide either slow or fast engagement.

Self-Lubricating Bearings

SELF-LUBRICATING bearings available in compositions of carbon, graphite or both have been announced by *Morganite Brush Co.*, Long Island City 1, N. Y. They are also supplied with various metallic contents for special applications. Bearings of these materials are immune to acids, alkali and most solvents. They have low coefficients of friction and expansion. The bearings can be molded to tolerance of 0.001 in. Outside diameters of ⅛ to 15 in. are obtainable. They can be supplied in any shape, sleeve or split type. Operating speeds to 50,000 r.p.m. with thrust loads to 30 lb. per sq. in. or loads to 2000 lb. at slower speeds are possible.

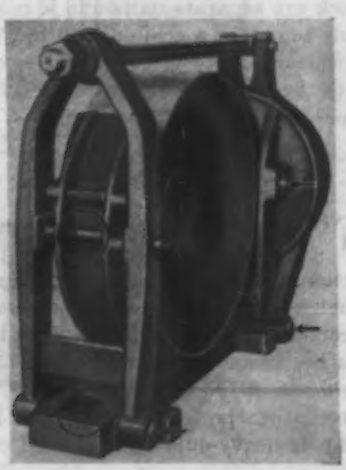


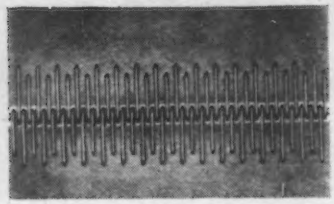
Open End V Belts

ADDITION of an "A" section with 17/32-in. top width and 5/16-in. thickness to its line of open and V belting is announced by the *B. F. Goodrich Co.*, Akron. Used where endless V belts do not meet the requirements, open end V belting is now available in four standard sections, A, B, C and D, of the same cross-sectional dimensions as endless V belts, allowing use of standard sheaves. Extension of the application of open end V belting to this smaller size has been made possible by development by the Flexible Steel Lacing Co. of a new fastener named Flex V. This fastener can also be used on B section open end V belting.

Improved Magnetic Brake

TO facilitate removal of the pivot pins in cases where magnetic brakes are given frequent and heavy coats of protective paint or where mill dirt, moisture and weather conditions tend to corrode equipment, the pins on *Cutler-Hammer* Type M shoe brakes are now protected by tubes which completely enclose the exposed section of the pin. The tube is fastened directly to the bearing without touching the pin, leaving the pin free for easy removal when it becomes necessary to renew the lining.



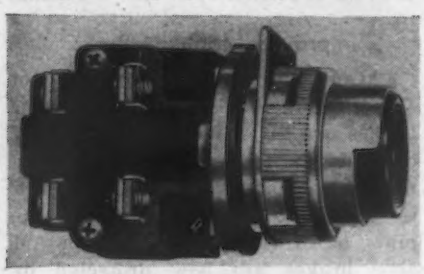


Wire Belt Hooks

HINGED-TYPE wire belt hooks, have been added to the line of belt lacing products of the *Bristol Co.*, Waterbury 91, Conn. The belt hooks are designed for joining all types of flat belting, including leather, fabric, rubber and balata. Various sizes are offered for belts up to ⅜ in. thick. The hooks are designed in such a way as to enter the belt in two rows with each opposite point passing into the belt in alternate rows so as to eliminate interference between opposite hook points.

Oil-Tight Pushbuttons

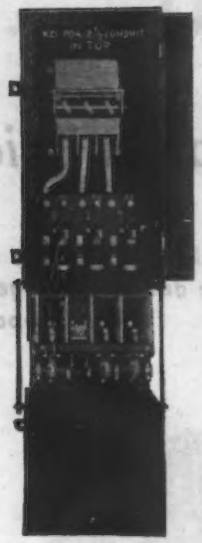
THE Industrial Controller Division of the *Square D Co.*, 404 N. Richards St., Milwaukee 12, has introduced its line of Class 9001 Type T oil-tight pushbuttons, designed primarily for group mounting on machinery or control enclosures. While



oil-tightness is the principal feature of this new line, the Type T units are more compact and can be mounted on closer centers than previous types without sacrifice of accessibility. The operating mechanism and the contact block are separate units and it is possible to obtain a combination to cover a wide range of circuit requirements with three types of operators and four types of contact blocks offered.

Combination Starter

FOR dusty or corrosive atmospheres where short circuit protection that does not require fuses or other protective devices is necessary, a combination starter, Type LZS-HR, has been announced by *Electric Controller & Mfg. Co.*, 2700 East 79th Street, Cleveland 4. The starter has a 3-pole heavy-duty oil-immersed con-



tactor, adjustable magnetic overload relays in each line of a 3-phase circuit and a disconnect switch with an externally operated handle. The high arc-rupturing capacity of the starter eliminates the need for a fuse or other protective devices subject to high maintenances in corrosive atmospheres. The starter is rated at 50 hp., 220 volt and 100 hp. at 440 and 550 volt. Rupturing capacity is 10,000 amp. Separately mounted push buttons are available to provide either low voltage protection or low voltage increase.

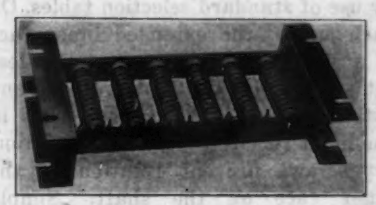
Auto-Switch Capacitor

A METAL-ENCLOSED, self-contained auto-switch capacitor that automatically switches 180 kva. of capacitance on or off the feeder in response to voltage requirements has been announced by *General Electric Co.*, Schenectady. Designed for improving the power factor of distribution circuits at periods of peak load, the capacitor is automatically connected in the circuit when increased load causes a drop in voltage and is disconnected when voltage increases at light load. The equipment consists of a 180 kva., 2400 volt delta or 4160 4 wire or Gr Y, 3-phase group of

Pyranol capacitor units, a 3-pole solenoid-operated oil switch, automatic voltage control devices and a potential transformer for supplying control power.

Bank-Type Resistor

THE development of the Regan Bank-type resistor has been announced by *Techtmann Industries, Inc.*, 828 North Broadway, Milwaukee 2. The resistors can be built from 2 to 24 resistors in a bank. The standard 6 bank resistor is 23 in long. For banks of more than 6 resistors, 3 in. is added to the length of the frame for each additional resistor. Cores, elements, straps and binding posts can be purchased separately. Glazed Steatite cores are another feature of the resistors, with a dielectric strength of 247 volts per mil.



Switch Copper

A SPECIALLY prepared switch copper with a polish that eliminates hand finishing of the metal before assembly has been announced by *Revere Copper & Brass, Inc.*, 230 Park Avenue, New York 17. The metal, which is cut to length, drilled and assembled by the equipment manufacturer, has close tolerances that include no convexity when flatness is measured across the width of the bar. Concavity is 0.001 in. maximum per side up to 2 in.; 0.002 in. per side, 2 in. and over; camber or depth of lengthwise arc, ⅛ in. maximum in 8 ft. It comes in square or rounded edges.

Small Diameter Stator

A STATOR for 1 hp. output that can be held to 2⅛ in. in diameter as compared with the usual 8 or 10 in. has been announced by *Robbins & Myers, Inc.*, Springfield, Ohio. The rotor operates at 10,000 r.p.m. at full load on 3-phase 180-cycle current.

PRECISION LATHE

PRECISION TOOL ROOM LATHE

PRECISION SECOND OPERATION MACHINE

PRECISION MILLING MACHINE

MASTER COLLETS & FEED FINGERS WITH PADS

LATHE COLLETS

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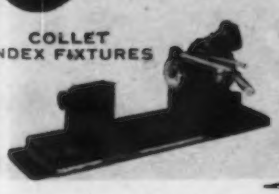
CIRCULAR FORM & CUT-OFF TOOLS

SPEED COLLET CHUCKS



COLLET INDEX FIXTURES

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Assembly Line . . .

STANLEY H. BRAMS

• Ford begins building 1946 cars in third day after new car go-ahead . . . First new models of auto industry are more highly powered . . . They spearhead a program to cover all price ranges.

DETROIT — Typifying the aggressive spirit pervading Ford Motor Co., the sprawling Rouge works gave birth last Tuesday to the first postwar automobiles —shiny new 1946 cars which were driven off the line in a blaze of klieg lights arranged for the accommodation of a Hollywood-size battery of photographers flanked by the entire Detroit industrial newswriting corps.

The new Fords are notable on several counts. For one thing, they make use of the 100 hp engine used in the Mercury of prewar days, refined and brought up to date, making them the most powerful Fords yet produced. These powerplants are equipped with aluminum pistons rather than steel, whose lightness makes possible the use of a heavier piston pin and four rings, thereby providing improved oil economy. Compression ratio is also increased somewhat. These aluminum pistons were used on the Ford 100 hp truck engines of recent years, but had no place in the Mercury passenger cars.

Another innovation of interest, predicated largely on wartime experience, is the use of shot-peened main leaves on each spring, expected to increase fatigue life quite considerably. The thickness of the spring leaves, incidentally, has been reduced and their number correspondingly increased. Valve springs are also shot-peened in the 1946 model.

A 6-cylinder engine is again optional on the new Ford, also featuring four ring aluminum pistons, a new improved distributor, oil filter and oil filtered air cleaner. General engine performance of this powerplant has been stepped up by use of a new higher lift cam. The engine develops 90 hp at 3300 rpm.

Also shown to the newsmen last Tuesday were hand-built models of the new Mercury and the new Lincoln, both of which will go into production a little later.

Ford plans to put eight complete series into the field sometime in the medium term postwar era, which probably means the 1947 model year. There will be three series of Fords, the 90 and 100 hp line announced last week, together with the new light Ford planned to underprice the others from 15 to 25 pct.

Replacing the one Mercury series of past years will be two. Between them they will blanket the field now occupied largely by Pontiac, Olds and DeSoto. Then there will be three Lincolns, one along the Continental type, touching the exclusive highest price field; a middle series intended to be competitive with the lighter Cadillac and the better Packards; and a third series aimed at the field dominated by Buick. Thus Ford will be represented in each price class from the lowest to the very highest, giving that manufacturer the widest potential distribution it has ever had.

IN fact, Ford officials are shooting at a production rate of 8000 units a day as soon as unlimited production is permissible. In the meantime, of course, anticipations are much more modest—"in the hundreds" for this month and "in the thousands" for August. But hopes run high at River Rouge that its quota will be increased, and sales executives see apparent indications that they will be, although they admit they have nothing solid on which to base their beliefs.

As reported here earlier, initial output will be concentrated at River Rouge, Edgewater, Louisville and Dallas. Shortly thereafter output will be undertaken at Buffalo, Chicago and Somerville, Mass.

Two new assembly plants will be built, one at St. Louis and one at Atlanta. In addition, two other plants will be erected, one on the East Coast and one on the West Coast. An an-

PICTURE OF THE WEEK: *The most newsworthy picture of this or many other weeks is this assembly line shot of cars coming to completion for the first time since February 1942. The scene is the "B" building at Ford's River Rouge works, where the cream colored tudor in foreground, about to be driven off the line, started the automobile industry on its postwar way.*

TAPPING TROUBLE? TYPICAL CASE SHOWS HOW ALERT "GREENFIELD MAN'S" QUICK SERVICE SOLVES PROBLEM

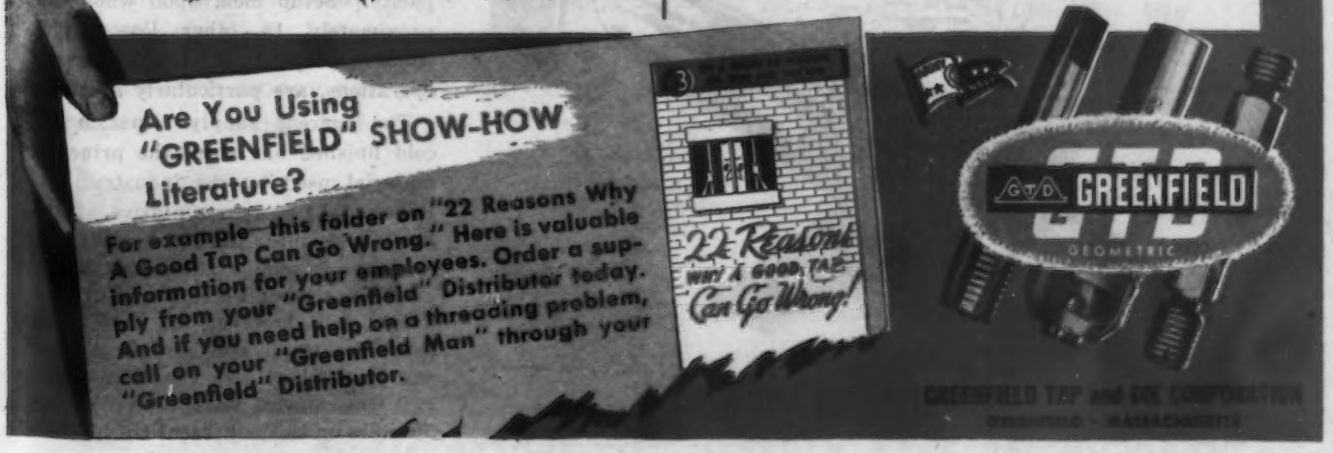
[A GTD SHOW-HOW REPORT]

1 A small southern plant, wrestling with new war order calling for close threading tolerances, was having trouble getting Class 3 fits. In re-ordering taps from "Greenfield," they mention problem in foot-note on the order, wondering if job calls for a "special" tap.

2 The "Greenfield" home office writes immediately for complete data needed to help customer with problem. Copy of correspondence automatically goes to "Greenfield Man" in customer's territory. "Greenfield Man," familiar with customer's tapping operation, suspects something other than the tap is causing the trouble. He visits plant immediately.

3 Customer shows him the tapping operation which is causing the trouble. "Greenfield Man," checking various factors which might affect accuracy, discovers tap and work are out of alignment, and suggests how to correct trouble.

4 Result . . . customer is able to get Class 3 fits with no difficulty and without the "special" taps he thought might be needed. His problem is solved —in a few days—thanks to alert, resourceful service from "Greenfield's" field organization.


Are You Using "GREENFIELD" SHOW-HOW Literature?
For example—this folder on "22 Reasons Why A Good Tap Can Go Wrong." Here is valuable information for your employees. Order a supply from your "Greenfield" Distributor today. And if you need help on a threading problem, call on your "Greenfield Man" through your "Greenfield" Distributor.
22 Reasons WHY A GOOD TAP Can Go Wrong!
GTD GREENFIELD
GEOMETRIC

nouncement on the latter operation may be expected shortly inasmuch as other Pacific area facilities are now tied up tightly with war work which gives evidence of continuing for an indefinite period.

To be reshuffled in the 15 assembly plants now sighted for Ford and the 17 which will operate when construction of the last two is completed will be production of Mercury and Lincoln cars as well as Fords. This will mark the first time that Lincolns have been built outside of the Detroit area; and Mercury output away from Detroit is also due for expansion, in line with Ford intentions of blanketing the field not only in a merchandising way but in a manufacturing way as well.

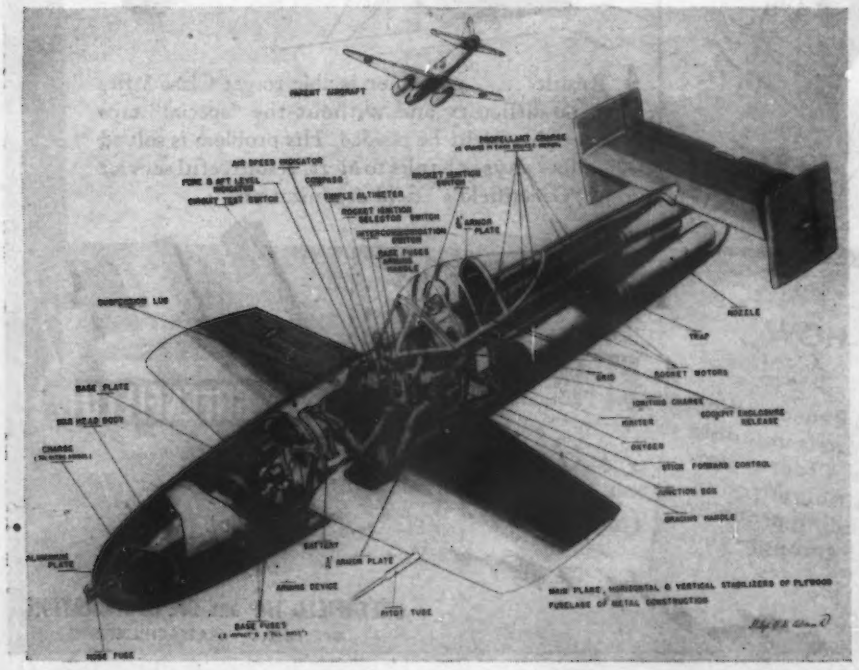
Helping Ford pull its rabbit out of the hat and get into production on the third day after WPB's go-ahead was the fact that when automobile production stopped in February 1942 a large bank of parts of practically every category was stowed away. These layaways were used for the first cars, and probably will maintain production until normal flows begin to come to the Rouge from suppliers.

FILLING the gap caused by the continued cutbacks in military schedules, the War Production Board has authorized another increase of approximately 126,000 units in civilian truck production for the last half of 1945. These are to be produced on an unrated basis. They bring proposed output for the last half of 1945 to a total of 440,000 units. Of these, 105,025 light trucks, 167,213 mediums and 41,788 light-heavy, heavy and off-the-highway vehicles have been authorized on a rated basis.

Apparently truck makers can produce in any size or weight category they desire to fill the new additional quotas together amounting to 126,000 units. The individual company shares of this block of 126,000 trucks are being allocated on the basis of their output during the years 1936-40 inclusive. All the allotments which have gone forward, however, are at the moment temporary. Manufacturers are supposed to explore their material and component situations and then report to the WPB Automotive Div. what part of their tentative allocations they will be able to produce during the rest of this year. Any slack thus uncovered will be taken up by additional authorization to other manufacturers, and the temporary quotas will then become permanent.

The forwarding of the individual quotas to manufacturers was accompanied with word that production in Group I and Group II labor areas is subject to clearance from the War Manpower Commission.

BAKA BOMB: *Diagram prepared by the U. S. Navy of the Japanese Baka Bomb, a flying torpedo controlled by a suicide pilot. The first of these were found at Okinawa and since then have been used against ships operating in the Ryuku Islands. The bomb is flown to the target by a parent aircraft, released and propelled by rocket motors.*



Screw Machine Output Of Rated Business Bars Civilian Items

Washington

• • • **The chief problem** confronting the screw machine industry is its inability to set delivery dates on orders to fill requirements for items that do not have definite allotments of materials, the War Production Board said in a report of the recent meeting of the Screw Machine Products Industry Advisory Committee.

The industry's production is now almost entirely for military items and for civilian programs that carry firm allotments of materials and components, industry members said. As military cutbacks take effect and military requirements for screw machine products decline, it would be desirable to have other civilian orders booked.

Discussion indicated that the automotive industry, normally the largest user of screw machine products, wants to place orders now to meet its requirements for the forthcoming civilian program. This has been set at 241,916 cars for the third and fourth quarters of 1945, but it carries no priorities assistance or allotments for materials. The present supply situation for materials needed in making screw machine produces makes it difficult to establish definite delivery dates for these advance orders, committee members said.

Production cannot be expanded beyond present levels because of lack of materials and of skilled workers. On the basis of a 120-hr. work week (two shifts), the industry is now running at approximately 70 to 75 pct capacity. Setup men, upon whom approximately 14 other less skilled workers depend in the industry's operations, are particularly scarce.

The current supply situation for cold finished bar steel, the principal material used by the industry, was reviewed by a representative of the Steel Division. Cold finish mills are, in general, unable to accept orders until November-December, he said. There will, however, be some open space for small size bars in August and September. No cancellations of any consequence have been received by mills up to the present time.

In One Year . . . .

A Gain of More Than 50%

in sales of LINCOLN PARK *Carboloy* GAGES

THE tremendous increase in the use of Lincoln Park Carboloy gages over the past year clearly indicates the present-day trend toward greater accuracy and economy in inspection operations. This gain is particularly emphasized by the fact that, ever since cemented-carbides were first used in gage manufacture, Lincoln Park has been the largest user of this wear-resistant material for this type of product.

Why are more and more manufacturers rapidly turning to greater use of Lincoln Park Carboloy gages? Here are reasons offered by two manufacturers: "The life of one steel thread plug gage was one 8 hour shift. One of your Carboloy gages has been in use for over 1½ years and is still serviceable" . . . "The average steel gage is good for 5000 pieces. The same gage of Carboloy gives us 250,000 and more." That's real economy in gage costs alone.

Of probably even more importance, Lincoln Park Carboloy gages have made it possible to save thousands of dollars through elimination of the rejection of expensive parts ordinarily inspected with gages made to include allowance for wear. In Lincoln Park Carboloy gages, wear allowance is not necessary. At no time are they "over-size", but are accurate to required limits from the first inspection.

Where *both* money and parts are being saved in inspection, Lincoln Park Carboloy gages are being used.

ARMY (E) NAVY

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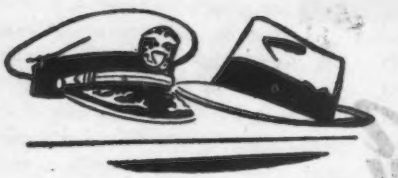
Washington . . .

L. W. MOFFETT

• Industry confronted by readjustment problem through extension of Renegotiation Act . . . War Dept's. renegotiation of contracts eliminates excessive profits.



WASHINGTON—The extension of the Renegotiation Act by the Congress to the end of the current calendar year leaves industry saddled with another burden during the difficult months of readjustment just ahead. The drop in contractual obligations of the military agencies indicates a quick return to competitive conditions in industry, thereby lessening the possibility of excessive profits. Industry feels that the government should permit some money to be accumulated to finance the needs of readjustment.

But this is past history. The act has been extended and its provisions must be enforced for another six months. A review of what has been accomplished under the act since its original enactment in April 1942, seems particularly timely.

Rules and procedures have become better understood both by contractors and renegotiation personnel during the past year. The administration of the act is proceeding with much less difficulty than was encountered in the earlier stages. Industry seems resigned to renegotiation and according to Undersecretary of War Robert P. Patterson, "Contractors, on the whole, are more and more cooperative."

The hearings preceding the enactment of the extension were not marked by the bitterness that prevailed in previous years. The National Assn. of Manufacturers, Chamber of Commerce of the United States and other organizations offered amendments, which were not accepted. NAM, while opposed to both renegotiation and repricing in principle, offered the proposal that only repricing or renegotiation be retained, but not both. However, the War Dept. maintains that these policies supplement each other. The department's position is that repricing cannot be so accurate as to capture all excess profits; therefore renegotiation is also necessary. Then, too, renegotiation is supposed to act as a deterrent to excessively high prices. It is also maintained that the benefits of repricing show up in renegotiation, for the manufacturer who follows close pricing policies incurs more risk and this risk is taken into consideration by contracting officers in the allowance of additional profits.

UP to March 23, 1945, the contracting agencies had made 91,423 renegotiation assignments and of these 68,962 were completed. Cancellations accounted for 32,290. There were 18,615 clearances, 17,678 settlements and 559 unilateral actions. Total recoveries as of this date were $5,957,404,000.

The War Dept., accounting for about three-fourths of the total business, has substantially completed the renegotiation of contracts and subcontracts to eliminate excessive profits accrued on war business in 1942 and 1943. Work is well underway on the renegotiation of 1944 business. About 31 pct of 15,707 War Dept. cases covering 1944 business have been completed as of the end of May. Of the 12,768 cases for 1944 being handled by Army Service Forces, 4080 or 32 pct have been completed. It is expected that all of the 1944 cases will be substantially completed by the end of the year.

Of the 49,353 assignments completed by the War Dept. for the past three years 35,007 were cleared or canceled as having no excessive profits and 14,346 were found to have realized excessive profits. Of the number involving excessive profits, 13,713 have entered into voluntary bilateral agreements under which the excessive profits have been eliminated and the balance of 633 have either resulted in unilateral determinations or are now in the process of further negotiation.

As of June 1, 1945, the renegotiating agencies of the War Dept. have effected refunds of excessive profits totaling $4,588,231,000. This figure is before adjustment for federal income taxes, which, it is estimated, would have taken approximately 70 pct of this amount in any case, leaving net refunds from renegotiation of about $1,376,000,000. These figures do not include price reductions which, as

BERLIN TODAY: *Proof of the devastation caused by Allied bombers and guns preceding the capture of Berlin is this shattered skeleton of the American Embassy on Unter den Linden.*

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TOUGH STEEL...TOOLS TAKE IT

SUNOCO EMULSIFYING CUTTING OIL

...removes 35 cu. in. of S. A. E. 1045 steel per minute

Cut deep . . . cut fast . . . cut long—that's the task for tools today, and throughout America production men are relying on Sunoco Emulsifying Cutting Oil.

In one operation, on an American Pacemaker Lathe, they were turning S. A. E. 1045 steel at 270 RPM and taking a cut ⅜" deep. The diameter of the piece being turned was 5"—350 surface feet per minute. In every minute, 35 cubic inches of tough steel were removed . . . but the tools "took the rap" thanks to Sunoco Emulsifying Cutting Oil.

Tool life increases when tools and work are flooded with Sunoco. The outstanding cooling and lubricating qualities of this cutting oil makes possible the prevention of overheating and drawing of the temper at the cutting edge and the reduction of "down time" for tool resharpening and resetting. Chips do not seize; the tools cut cleanly . . . evenly . . . at high surface speeds.

To speed production in your plant, get the details on Sunoco Emulsifying Cutting Oil . . . and to get worthwhile factual data on all types of machining operations, write for your copy of "Cutting and Grinding Facts" to . . .

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SUNOCO

SUN INDUSTRIAL PRODUCTS

OILS FOR AMERICAN INDUSTRY

of April 30, 1945, total $3,103,374,000 and which, to a substantial extent, are attributable to the Renegotiation Act and its administration.

FROM April 28, 1942, the date of the passage of the original act, until June 30, 1944, the estimated expense to the War Dept. of conducting statutory renegotiation was $11,742,407. The expense during the fiscal year 1945 will be about $7,600,000. Thus the total expense to the War Dept. since the enactment of the law is about $19,000,000.

Personnel engaged in renegotiation in the War Dept. reached a peak of 2112 on Dec. 31, 1943. Quarterly figures since then have, with one exception, shown successive decreases to 1758 persons on March 31, 1945. This is a 17 pct decrease from the peak period.

Repricing has also resulted in substantial savings. The War Dept. has at its disposal several methods of repricing: Individual contract pricing and company pricing are voluntary negotiations. Mandatory repricing is permitted under Title VIII of the Revenue Act of 1943, but this has been invoked in only one case.

The War Dept. says that if January 1942 prices prevailed for War Dept., Army Air Forces and Army Service Forces items, the additional cost would have been more than $35,000,000,000 than if figured at February 1945 prices.

The greater drop in prices in the Army Air Forces is almost entirely due to the fact that so much of its total is composed of items of a new and different character, ordered in previously unheard of quantities. The problem of determining a proper price for the first order was impossible of solution. With experience these original prices were substantially reduced.

The only department whose prices are up is the Quartermaster Corps. This is largely because Quartermaster buys items which account for most of the general rise in the cost of living, such as leather, textiles and food. The drop in Ordnance and Signal Corps prices follows much the same line as AAF.

ABOUT 650 companies have already been repriced and approximately 1000 are under discussion. They are chosen primarily from companies which have had excessive profits in renegotiation. It is expected that eventually between 2000 and 3000 will have been repriced. The ending of the war in Europe has made no change in these plans, but officials in the Purchase Div. realize that as the supply conditions ease and competitive conditions reappear the need for negotiated pricing will gradually fade away.

One of the generally mistaken impressions about price redeterminations is that they are always downward. This is not actually the case for many result in upward determinations. This generally occurs when a new contract is placed and the contractor proves his case for a higher price. It also comes up in many long-term contracts, where a specified price runs only for a short period of the contract. In this way, there may be several price changes within the life of one long-term contract.

Although most of the price decreases reflected in the charts are due to individual contract repricing, with the latter months showing some of the effects of company pricing, price decreases are also due, according to Undersecretary Patterson to increased industry efficiency and a better knowledge of prices on the part of both contractors and government.

Of the 885 items in the War Dept. index, comprising the major procurement items, 269, or approximately 30 pct of the items, had price actions occurring in May. Of these, 128 declined, 62 increased and 79 remained unchanged. In Ordnance 50 items declined, 11 increased and 10 remained unchanged; in Quartermaster 19 declined, 34 increased and 8 remained unchanged, and in Air Forces 34 declined, 4 increased and 15 remained unchanged.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

I LOOKED AT THE DRAWIN' AND I THOUGHT I WAS DOIN' IT ALL RIGHT! I'M SORRY I SPOILED THE JOB--I SHOULD HAVE BEEN MORE CAREFUL, I GUESS!
YEAH, YOU SHOULD! WELL, WE ALL MAKE MISTAKES--THROW IT OUT AND START OVER, AND THIS TIME KEEP YOUR EYES OPEN!
DID YOU HEAR THAT? HE SPOILED A HUNDRED-DOLLAR FORGIN' AN' THE BULL O' THE WOODS HARDLY BLINKED AN EYE! HE'S LUCKY!
YOU SAID IT! AND YET IF THAT GUY WAS SHORT TEN CENTS IN HIS PAY SOME WEEK HE'D YELL MURDER!
J.R. WILLIAMS
TWO VIEWPOINTS 7-13
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Offer Tools and Accessories

New York

• • • **Surplus tools**, attachments and accessories for machine tools and other metal working machinery is offered in List No. 155 by the New York office of RFC located at 70 Pine St.

Correction

• • • THE IRON AGE of July 5, p. 102, quoted from a letter by SPB Chairman Guy M. Gillettee to Senator O'Mahoney recommending a single administration, rather than a board, to deal with sales of surplus property. He said that the agency should not be subjected to policies of the Office of War Mobilization. The article inadvertently omitted the negative term *not*.

Have you seen the new day coming?

Even in the pre-dawn darkness of war there are signs that it is on the way. . . . It *can* be the greatest day the world has ever known.

Already men, materials and American ideals have penetrated to the last wildernesses of the earth. There's a trans-Atlantic flight every 13 minutes of the day and night . . . 160,000 miles of air routes being flown by American transport planes . . . our air strength is double that of the rest of the world combined . . . our manufacturing productivity half of the world's total capacity. We have what it takes to *force* prosperity and to *enforce* peace.

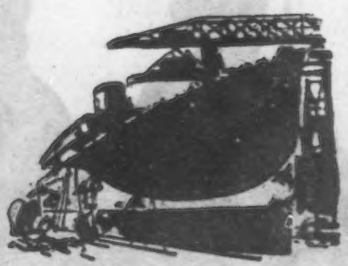
We at Bryant feel that we're part of the new day that's coming. Our record in war links us with great production achievements, from the millionths-of-an-inch precision in the modern airplane engine to the millions of things that we'll help to produce more simply, faster, for less. We urge you to call us in now!

BRYANT CHUCKING GRINDER COMPANY SPRINGFIELD VERMONT, U.S.A.

West Coast . . .

OSGOOD MURDOCK

• Possibility of leasing Geneva plant discussed by DPC Director Husbands . . . Utah traffic consultant suggests $7 rail freight rate on finished steel and $6.85 on tinplate, Geneva to Pacific ports.



SALT LAKE CITY—Lease instead of sale of Geneva now appears to be the preferred prospect for the disposition of the Utah plant, according to Sam Husbands, DPC director.

All three offers for the plant from U. S. Steel, Henry Kaiser and CF&I indicate their interest in its acquisition but, according to Mr. Husbands' statement, "They would not care to spend their own money in conversion since the leasing period would be five years."

In CF&I's proposal, W. A. Maxwell, president of the firm, proposes supplementary finishing facilities to cost approximately $73 million, apparently to be furnished by DPC. This bidder seeks to produce annually 105,000 net tons of structurals, 100,000 tons of plate, 48,000 tons of butt weld pipe, 45,000 tons of railroad steel car wheels, axles and springs, and 120,000 tons of freight cars and accessories.

Two new studies dealing with Geneva's potential markets and freight rates have been released. One is prepared by Dr. J. R. Mahoney, director of the Bureau of Economic and Business Research at the University of Utah, and the other is a transportation study prepared by H. W. Prickett, transportation consultant for the Utah State Dept. of Publicity and Industrial Development.

Dr. Mahoney's study, supplementing his former reports, stresses the importance of the 500,000-ton western tinplate market divided between 35 can factories and dominated by eight integrated steel companies, the principal one being U. S. Steel.

Assuming a postwar tinplate mill at four different points, Dr. Mahoney computes the ton miles required to supply this market as follows:

From Geneva	343,062,583
From San Francisco	454,448,091
From Los Angeles	488,889,163
From Seattle	555,964,321

This ratio is based on the assumption that the tinplate mill, wherever located, would get its hot-rolled coils from Geneva. Percentagewise, the excess transportation over the Geneva location works out to 32 pct for San Francisco, 42 pct for Los Angeles and 62 pct for Seattle. Using ton miles in his calculations, for lack of published rates between many of the points, Dr. Mahoney concludes that central Utah is the most economic location for a cold reduction mill. He points out that the cold reduced product could be shipped to fabricating plants in any western city as economically as hot rolled steel could be shipped to a cold reduction mill in the same city.

"Location of a cold reduction mill at Geneva would permit maximum development of western steel fabrication and would supply steel products to all the west at the lowest possible prices," he states. To obtain a basis of comparison for the necessary transportation, Dr. Mahoney develops what he calls "population miles"—the product of population times mileage to market—as follows:

Geneva	7,176,775,000
Los Angeles	14,690,020,000
Denver	15,177,811,000
San Francisco	15,237,079,000
Portland	17,863,042,000
Seattle	20,194,752,000

Geneva should be made complementary, not competitive, to other western steel plants, Dr. Mahoney believes, and he further suggests that the sale price could be arrived at on a fair value per ton of usable capacity and by periodically reappraising the value of the plant on a basis of the percentage of capacity which the market could absorb.

IN the Utah Industrial Dept. Report H. W. Prickett takes all freight factors into consideration, conceding that cost is only one of them, and suggests new maximum rates until reopening of the Panama Canal. He proposes a rail rate of $7 per net ton for iron and steel products and $6.85 for tinplate, from Geneva to Pacific Coast ports.

Mr. Prickett computes the out-of-pocket cost of transporting steel from Geneva to Coast destinations at $3.54 per net ton. He points out that this figure indicates the floor to which railroads could go in order to meet intercoastal water competition.

Against the present $12 tariff rate to San Francisco and Los Angeles, and the $8 Section 22 war emergency rate on government shipments, Mr. Prickett sets the following existing published rates: Pig iron, $4.95 from Ironton to Pacific Coast; tinplate, $15.40 from Chicago to Coast points; finished steel, $4.40 from Fontana to San Francisco; alumina, $4.80 from Kalunite, Utah to Tacoma Wash.; coal, $4.35 from Sunnyside, Utah to Fontana; iron ore, $2.62½ from Iron County, Utah to Fontana; iron ore, $3.44 from Iron County to Minnequa, Colo.

The $3.44 iron ore rate from Iron County to the CF&I plant, it is pointed out, involves a longer haul than from Geneva to San Francisco and again shows how low the carriers can go under competitive pressure.

Other conclusions at which the study arrives are:

(1) Rail carriers should, and probably will, voluntarily establish rates on those products not competitive with those of CF&I, which will allow Geneva to compete at least half-way eastward to Chicago.

(2) Transportation costs on coal and iron ore would make it economically advantageous for Fontana to obtain its pig from Geneva or Ironton, instead of producing it at its own plant.

(3) That it will serve the rail carriers' own advantage to establish rates competitive with water carriers, and retain their tonnage instead of letting it revert to intercoastal ocean traffic.

(4) That competitive freight rates will enable Geneva to sell in the intermountain region and export to the Pacific basin in addition to encouraging industry in the western states.

San Francisco—Western Pipe & Steel Co. has just been award-

WHAT'S AHEAD FOR YOUR BUSINESS?

Find Out Today How EX-CELL-O'S Complete Parts Production Facilities Can Help You Meet Tomorrow's Tough Competition

With a complete organization under one responsible management . . . *an organization built upon years of varied engineering experience, modern machining methods and heat treat facilities, and practical inspection staffs* . . . Ex-Cell-O probably has the exact solution to the parts production problem you face. Ex-Cell-O field engineering representatives will be very glad to sit down and talk it over with you.

Above: Sectional view of Ex-Cell-O precision boring department for miscellaneous production parts.

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DETROIT 6, MICH.

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XLO
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The Ex-Cell-O organization, with skill, facilities and modern methods that have made a wartime record, can make an important contribution in the planning of quantity production of quality parts and unit assemblies for your postwar product.

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Box Carburize Furnaces
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Milling Machines
Broaching Machines
Precision Thread Grinders
Precision Boring Machines
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For many years Ex-Cell-O has supplied large and small manufacturers with parts and has also supplied many parts in unit assemblies after machining, heat treating and grinding.

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Ex-Cell-O has always maintained that quality in a product is not the result of accident; that quality is built into a product by rigid adherence to accepted quality standards . . . standards that are upheld at Ex-Cell-O by efficient inspection at every step of the machining process.

ed an order for 4000 shelters to house Army personnel in the Pacific.

The basic dimensions of the huts are 20 x 48 ft. Material is 14 and 16 gage steel with outside sheeting and roofing to be 25 gage aluminum all bolted and screwed. The shelters are to be insulated with 7,000,000 ft. of Firtex and Canex. The job calls for 11,000 tons of steel and almost 2000 tons of aluminum. Western Pipe is farming out to subcontractors a goodly portion of the work.

The work is being let on a negotiated contract and is part of an overall order for 16,000 shelters from the Ohio District Corps of Engineers in which Luria Steel Trading Corp. and Utica Steel are participating in the East. The western end of the contract is being handled by Col. Kenneth M. Moore, District Engineer in San Francisco.

* * *

Alcoa has been awarded one of the largest aluminum orders ever placed by Bonneville Power Administration for transmission line materials, involving some 1000 tons for 1276 linear miles of conductor in three sizes.

Material for the order will originate in New York, but will be offset by equivalent tonnage in Northwest plant production.

Simultaneously, Bonneville has contracted with the General Electric Co., at Portland, for the highest capacity power transformer bank in the world. Four transformers, costing $772,000 will be installed in the Troutdale substation, three in a bank and the fourth as a spare. Individual capacity of the four will be 50,000 kva, self-cooled and 83,333 forced-air cooled.

* * *

Running counter-current to recent aviation cancellations, Northrup Aircraft has been awarded what is said to be the largest airplane order awarded since VE-Day. The amount of the contract is $25,000,000 and, according to Lamotte T. Cohu, president, will mean peak production through 1946, and will require 2000 additional production line workers. This award lifts Northrup backlog to a total of $146,000,000.

* * *

Another small bright spot appears on the otherwise cloudy San Francisco Bay shipyard picture with the start of construction on invasion barges for the U. S. Army at Marinship, Sausalito. New ways have been completed to house the barges, and construction is already under way on the first 30. Each barge is to be 100 ft. long, 29 ft. wide and 9 ft. high, all-steel riveted. At peak production they are to be turned out at the rate of five a week.

* * *

On the transportation front, Pacific Greyhound Lines has just received permission from the California State Railroad Commission to purchase 60 new inter-urban type buses in an effort to relieve Bay Region commuter congestion. The buses are to cost $13,000 each, according to M. C. Fraley, who also says that it is the first large scale addition to the line's equipment since the war. They are required to meet the passenger traffic generated by re-activation of many Army camps on the West Coast.

At the same time, the Western Pacific RR places an order with Baldwin Locomotive Works for five 1000 hp. diesel switching engines for $40,000, dampening somewhat the enthusiasm of western rooters for the western diesel industry.

Cited for Awards

• • • **The following companies** have received Army-Navy "E" awards for outstanding war production:

Army-Navy "E"

Bendix Radio Div. of Bendix Aviation Corp., Towson, Md. (third star)
National Roll & Foundry Co., Avonmore, Pa.
Copco Steel & Engineering Co., Detroit (third star)
Illinois Gear & Machine Co., Chicago (fourth star)
Caterpillar Military Engine Co., Decatur, Ill.
Alabama Pipe Co., Ornamental-Emory plant, Anniston, Ala.
American Radiator & Standard Sanitary Corp., plants in Baltimore, Pittsburgh and Buffalo.
Anchor Slide Fastener Co., New York.
B. A. Ballou & Co., Providence.
Central Foundry Co., Southern Div., Holt, Ala.
Chase Brass & Copper Co., Inc., Cleveland mill, and Euclid Case plant, Euclid, Ohio.
Columbia Aircraft Products, Inc., Somerville, N. J.
Consolidated Vultee Aircraft Corp., Tucson, Ariz.
Corsicana Cotton Mills, Corsicana, Tex.
Doehler-Jarvis Corp., Doehler Die Casting Division, Chicago.
Durabilt Mfg. Co., plants Nos. 1 and 2, Aurora, Ill.
Federal Telephone & Radio Corp., Newark, N. J.
Edwin I. Guthman Co., Inc., and Lincoln Machine & Tool Co., Chicago.
Heyden Chemical Corp., Heyden Penicillin plant, Princeton, N. J.
Hill Independent Mfg. Co., Philadelphia.
Ideal Clamp Mfg. Co., Inc., Brooklyn.
Johnson Gage Co., Bloomfield, Conn.
Johnston Lawn Mower Corp., Ottumwa, Iowa.
Lewis Welding & Engineering Corp., Bedford, Ohio.
Lockley Machine Co., New Castle, Pa.
Clayton Mark & Co., Evanston, Ill.
Monroe Tool & Mfg. Co., Monroe, Mich.
Nathan Mfg. Co., New York.
Schnabel Co., Pittsburgh.
Setter Bros., Inc., Cattaraugus, N. Y.
Vogt Bros., Mfg. Co., Louisville.
Wichita Engineering Co., Wichita Falls, Tex.
Williams Tool & Engineering Corp., Indianapolis.

Hunters Point Naval Drydocks, on which the Navy has spent $70 million in the last five years, has received approval from Navy Secretary Forrestal for improvements totaling $8,660,000. The largest single item of $3,888,000 is for a structural and boiler shop. Vice-Admiral Ben Morrell states that the appropriation is subject to reduction or cancellation should war conditions change.

* * *

Shipbuilding technique is about to be applied to the aircraft industry as the WPB approves a $204,000 graving dock at Long Beach for the "world's biggest plane." Plans call for facilities for maintenance in a building which will be part of the graving dock and an experimental base at Pier E, Long Beach.

The giant Hughes plane is designed to carry 750 soldiers with their equipment. Wingspread of the plane is 300 ft.—in comparison with the B-19 land plane's 212 ft. wing, and the Martin Mars seaplane's 119 ft. wing. The hull is plywood and measures 220 ft. in length. The plane is powered by eight 3000 hp. engines and is designed for intercontinental freight with a payload of between 60 and 70 tons. First flight is not scheduled until early in 1946.

Calship to Start Work On Repair Operations

Los Angeles

• • • **John A. McCone,** president of the California Shipbuilding Corp., announced that the U. S. Maritime Commission and the Navy Dept.'s Bureau of Ships have come to all basic agreements concerning the use of Calship for ship repair and conversion. Actual papers and contracts covering the repair operations, which will supplement the big Terminal Island shipyard's new-ship construction program, are now being processed, Mr. McCone said.

Planning has been done for necessary facilities and equipment, which are being ordered.

Repair work at Calship will be limited to facilities presently available and to additional facilities as they are vacated by completion of new-ship construction.

Mr. McCone said that as many as possible of the shipyard's present employees will be utilized on repairs. As additional Calship facilities become available for repair work, additional employees will be absorbed into the new operations.

The most revolutionary advance in modern oil-hydraulics

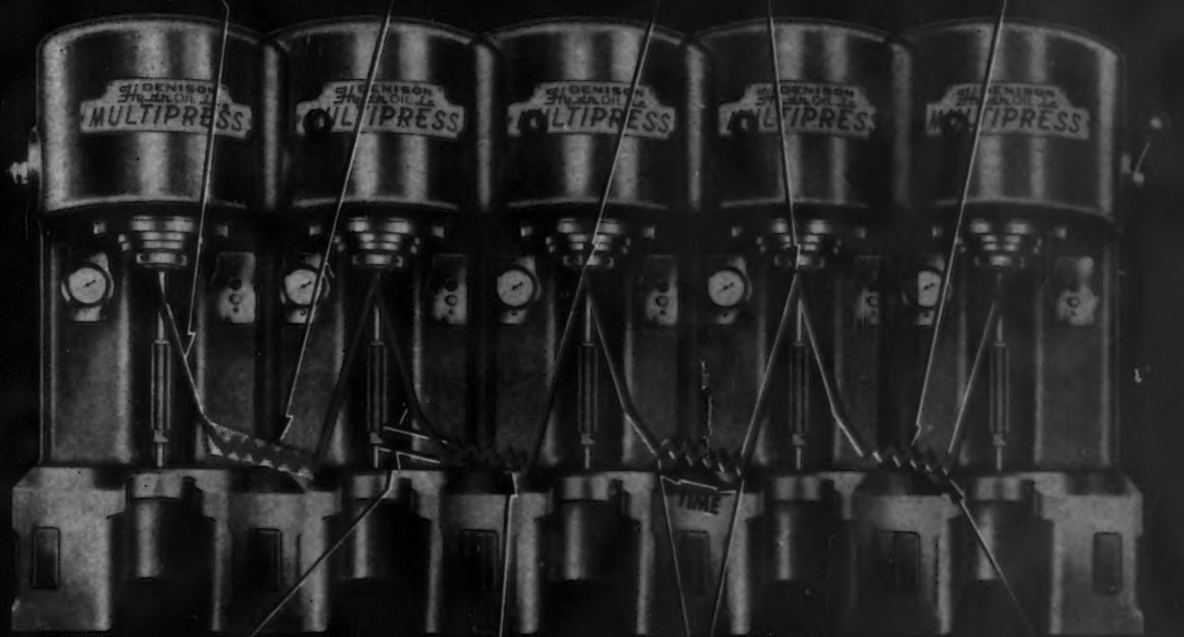
MULTIPRESS with VIBRATORY HydrOILic PRESSURE

FAST APPROACH PORTION OF STROKE (FIXED SPEED)

REGULATIVE PRESSING SPEED PORTION OF STROKE (20 to 200 ipm)

MANUAL OR FULLY AUTOMATIC RAM CYCLING

EACH REPEAT STROKE EXERTS EXACT PRE-SET PRESSURE



LENGTH OF REPEAT STROKES REGULATIVE .004 to 1/2-inch

NUMBER OF REPEAT STROKES REGULATIVE 1 to 25, automatically 1 to infinity, manually

FREQUENCY OF REPEAT STROKES REGULATIVE

RAM FOLLOWS WORK AS IT YIELDS, EXERTING EXACT PRESSURE

Vibratory HydrOILic Pressure — just *one* of many unique control features available with the amazing new MULTIPRESS — imparts any pre-set number of short, rapidly-repeated, exact-pressure strokes *upon each full downstroke of the ram!*

As shown above, these repeat strokes are regulative in length, pressure, speed, frequency, and number per ram cycle. And the ram *follows the work* downward as it yields, exerting exact pre-set pressure on each vibratory stroke.

MULTIPRESS — a completely self-contained, motor-driven, oil-hydraulic bench press, in 4 and 6-ton sizes — makes this *exactly controlled* vibratory action available at surprisingly low cost. Other MULTIPRESS accessories include automatic cycling controls, straightening fixtures, reciprocating tables, pelleting devices, automatic indexing tables, foil feeds, a variety of bolster plates, benches, extension tables, side shelves — to mention only a few. Write today for further information. The Denison Engineering Co., 1158 Dublin Rd., Columbus 16, O.

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PERSONALS

WILLIAM C. SNYDER, JR., president and general manager, Continental Foundry & Machine Co.

• **William C. Snyder, Jr.,** formerly vice-president and director of Blaw-Knox Co. and president and general manager of the Lewis Foundry & Machine Div. of that company, has been appointed president and general manager, Continental Foundry & Machine Co., Pittsburgh. Mr. Snyder has succeeded **G. N. Hermann,** who asked to be relieved of the presidency in view of his desire to move to California, where he will continue to be associated with the company as general sales representative for the entire West Coast area.

• **Edward M. Dowd,** general superintendent, Lapointe Machine Tool Co., Hudson, Mass., has been made executive assistant to John J. Prindiville, Jr., vice-president. Mr. Dowd came to the Lapointe plant several months ago from the American Bosch Corp. where he was superintendent in charge of engineering and manufacturing post-war products.

• **L. F. Lottier** has been appointed metallurgist for the Accurate Steel Treating Co., Chicago. For the past 12 years Mr. Lottier has been assistant metallurgist for the Peoples Gas Light & Coke Co., Chicago.

• **Matthew J. Dennin** has been placed in charge of purchases and sales, new steel division, M. S. Kaplan Co., Chicago. He recently was in charge of the steel unit, surplus property division, Reconstruction Finance Corp., and previously had been associated with the redistribution division of WPB. Prior to entering government service he was employed by United States Steel Export Co. for more than 25 years.

• **W. C. Perkins** has resigned as Pittsburgh district sales manager, American Chain Div., American Chain & Cable Co., Inc., Bridgeport, but will continue with the company as a special representative with headquarters at York, Pa. **W. M. Cusack,** formerly Detroit district sales manager, has succeeded Mr. Perkins in Pittsburgh. **C. A. Goldstrohm** has been appointed district sales manager of the Southern District with headquarters at York, Pa.

• **R. R. Stratton** has been appointed sales manager of the Davis Can Co., following his resignation as district manager of the Smaller War Plants Corp. The company is a subsidiary of the Van Dorn Iron Works Co., Cleveland.

• **Boyd K. Pond** has been appointed district manager of the Radio Div., Bendix Aviation Corp., Detroit, with headquarters in Detroit.

• **Frank E. Walling,** vice-president in charge of operations of the Lewis Foundry & Machine Div., Blaw-Knox Co., Pittsburgh, has been named acting manager of the divison, succeeding **W. C. Snyder, Jr.,** who has resigned as general manager. Mr. Walling joined the division in 1941 as assistant to the manager. Prior to that he had been superintendent of rolling of the Duquesne Works of Carnegie-Illinois Steel Corp.

FRANK E. WALLING, acting manager, Lewis Foundry & Machine Div., Blaw-Knox Co.

CHARLES A. BUTCHER, assistant general manager, Crocker-Wheeler Div., Joshua Hendy Iron Works

• **Charles A. Butcher,** formerly manager of the Pacific Coast manufacturing and repair department, Westinghouse Electric Corp., Oakland, Calif., has been appointed assistant general manager, Crocker-Wheeler Div., Joshua Hendy Iron Works, Ampere Station, N. J.

• **Dr. Nelson W. Taylor** has been appointed technical assistant to the director of research, Minnesota Mining & Mfg. Co., St. Paul, Minn. He will also continue as head of the ceramics section.

• **James H. H. Bradford** has recently been made sales and advertising manager, Wm. Schollhorn Co., New Haven, Conn. Prior to his recent military service, Mr. Bradford was owner of The Howe Co., Springfield, Mass.

• **L. T. Dalecke,** assistant director of the Fisher Body Div. aircraft section, has been named general factory manager of Fisher assembly plants of General Motors Corp., Detroit. **H. D. Burnside** has succeeded Mr. Dalecke in the aircraft section.

• **W. J. Morris** has been named chairman of the board of directors, Continental Supply Co., Ltd., Dallas, a sales subsidiary of Youngstown Sheet & Tube Co., and **Fred M. Mayer,** formerly vice-president and treasurer, has been elected president, while continuing as treasurer. **Frank I. Brinegar,** a vice-president, has become executive vice-president as well as a director.

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Lindberg Brazing Furnaces are designed and built with the guts to withstand the heaviest kind of production schedules. Because of the simplicity and strength of construction, maintenance is reduced to a minimum and down-time is cut to the bone.

The heating chamber contains no alloy to warp or deteriorate. The silicon carbide hearth withstands heavy loads of heavy pieces. Non-metallic heating elements, with maximum operating temperatures to 2500° F., are quickly and easily replaced without cooling down the furnace. Throughout its construction the Lindberg Brazing Furnace is heavy steel plate, welded gas-tight.

These are only some of the reasons for the success of Lindberg Brazing Furnaces which will do high temperature copper brazing, low temperature silver brazing, sintering of powder metals, general tool hardening, high speed tool hardening and bright annealing. Get all the facts about this hand-pusher type furnace in our new bulletin 201. Lindberg Engineering Company, 2452 W. Hubbard Street, Chicago 12, Illinois.

LINDBERG *Furnaces*

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FRED A. EMM, general superintendent, Rustless Iron & Steel Corp.

• **Fred A. Emm** has been appointed general superintendent of the plant of the Rustless Iron & Steel Corp., Baltimore. Mr. Emm has been superintendent of the wire mill since he came to Rustless in 1935. Prior to coming to Baltimore Mr. Emm had been with the Crucible Steel Co., Mond Nickel Co. and International Nickel Co.

• **Clemons H. Davis** has been appointed manager of the Foil Div., Reynolds Metals Co., for the Detroit, Cleveland and Pittsburgh areas. Before coming to Reynolds in 1944, Mr. Davis was regional sales manager of the Chrysler Corp. and prior to that had been general sales manager of the Detroit Die Casting Co.

• **J. F. Joy**, formerly director of engineering, Federal Machine & Welder Co., Warren, Ohio, has been elected vice-president in charge of engineering.

• **William L. Davis** has been elected vice-president in charge of operations, United States Steel Supply Co., Chicago, subsidiary of U. S. Steel Corp. He has been associated with U. S. Steel subsidiaries for the past 40 years, most recently as manager of operations for the Supply Co.

• **Ray Ellinwood** has resigned as president and general manager of Adel Precision Products Corp., Burbank, Calif., to organize a business bearing his name.

• **Allen W. Schmidt** has been appointed sales promotion manager, Kelite Products, Inc., Los Angeles.

• **Lt. Gen. William S. Knudsen** has been re-elected a member of the Board, General Motors Corp., Detroit, from which he resigned in 1940 to serve in the national defense program. Gen. Knudsen formerly was president of the corporation and a member of the Policy and Administration Committees. **Col. Graeme K. Howard** was also re-elected vice-president, after three and one-half years' service with the Army. Col. Howard has been placed on inactive duty and will return to General Motors Overseas Operations on Aug. 1 as European regional manager.

• **Malcolm Fleming**, vice-president and director of Hickman, Williams & Co., Chicago, who has been in charge of operations in the Cincinnati territory for the past 20 years, has resigned. **C. H. McNeill**, secretary and treasurer, has been elected to the board of directors and will continue in charge of the general office at Cincinnati. **Houston C. Rogers**, associated with the company in the coal department for 20 years, has been appointed district manager of the Cincinnati office and **L. C. Snyder** has been appointed resident manager.

• **Paul B. Greenwald** has been elected vice-president and general superintendent, Carpenter Steel Co., Reading, Pa., and **B. H. DeLong** has been elected vice-president in charge of research and development.

• **Harry E. Foster** has been appointed treasurer, B. F. Goodrich Chemical Co., Cleveland. Mr. Foster, who was formerly general auditor, also has become assistant secretary of The B. F. Goodrich Co.

ARCHIE V. MURRAY, president, Scaife Co., as announced in THE IRON AGE of July 5.

• **Henry G. Schmidt**, chairman of the board, North American Coal Corp., Cleveland, has been elected president and chief executive officer. **O. C. Larson**, president since July 1938, has resigned. Mr. Schmidt will head all of North American's subsidiary companies.

• **Walter F. Munford** has been named assistant vice-president, American Steel & Wire Co., Cleveland, subsidiary of the U. S. Steel Corp. **George A. Gleason** has been made manager of operations of the Worcester, Mass., district, succeeding Mr. Munford. Mr. Gleason was formerly general superintendent of the company's South Works in Worcester.

• **Thomas Butts** has been named director of a new office of the Baldwin Locomotive Works, Eddystone, Pa., which will be opened in Paris, Sept. 1.

OBITUARY...

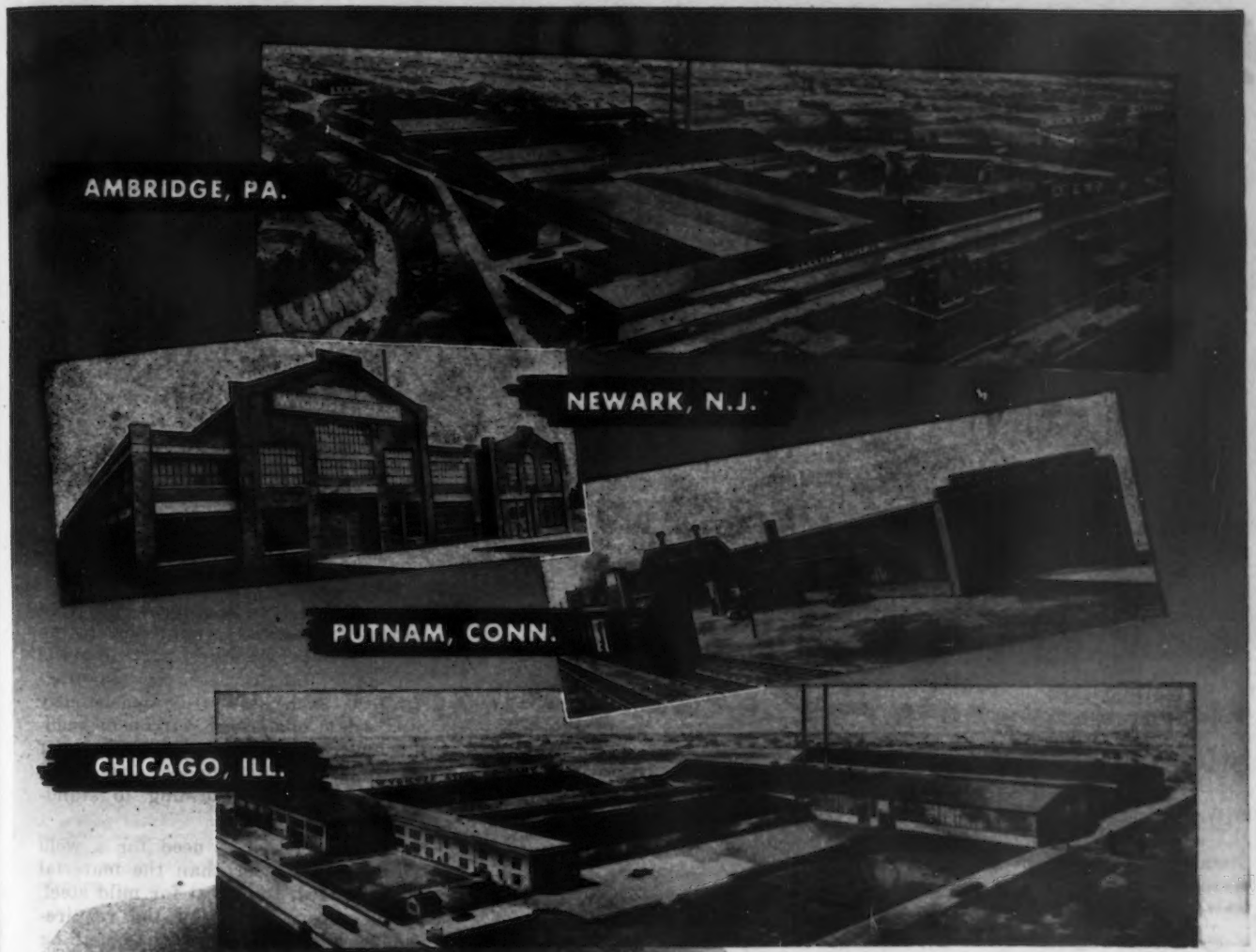
• **Clarence A. Hight**, chairman of the board of the U. S. Smelting, Refining & Mining Co., Boston, died June 30. He was 77 years old. In 1923 Mr. Hight became vice-president and general counsel of the company, three years later became president, and in 1937 he was made chairman of the board.

• **Henry P. Mueller, Sr.**, general manager of the Century foundry, Century Electric Co., St. Louis, died June 24.

• **Donald L. McCubbin**, 55, manager of the Cincinnati plant, Joseph T. Ryerson & Sons, Inc., Chicago, since 1932, died June 29. He had been associated with the company for 25 years.

• **Eugene A. McBridge**, a plant manager for Thompson Products, Inc., Cleveland, and its subsidiary, Thompson Aircraft Products Co., for 16 years, died recently at the age of 57.

• **Benjamin Briscoe**, 78, automotive pioneer and at one time president of the Maxwell-Briscoe Motor Co., Detroit, and organizer of the United States Motor Co., died recently.



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★ Carbon and Alloy
Rounds ⅛" to 6"
Squares ⅛" to 4"
Hexagons ⅛" to 3⅞"
Flats ⅛" x ¼" to 2" x 12"

★ Turned and Polished Shafting

★ Turned and Ground Shafting

★ Special Sections

With unexcelled furnace facilities for producing a complete range of sizes and treatments.

FROM 1 to 4

***. . . because of constant adherence to the highest standards of* QUALITY, ACCURACY *and* SERVICE TO INDUSTRY**

. . . and when the guns of war are silenced, a network of representatives from coast to coast, with complete warehouse stocks in every large industrial center, will be ready to serve your *every* need for cold finished steel products. In the meantime, let Wyckoff engineers work with you, in planning for those *cost-saving* days to come.

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Dear Editor:

GENEVA FREIGHT RATES

Sir:

Please send immediately to our Washington office 10 tear sheets of article by Charles Post "Chicago Mills Ponder Geneva Steel Freight Rate Proposal"; also send 15 copies to this office.

VANCE FAWCETT
Kaiser Co., Inc.,
Iron & Steel Div.,
Oakland, Calif.

● Sorry we do not have 25 copies available, but have mailed 17.—Ed.

LIGHT METAL CASTINGS

Sir:

Would like to obtain a copy of "Light Metal Permanent-Mold Castings," published in the Dec. 28, 1944 issue.

N. GASSMANN,
Superintendent
Commerce Pattern Foundry & Machine Co.,
Detroit 17, Mich.

● Tear sheets have been sent.—Ed.

GLUED METAL STRENGTH

Sir:

We should like to obtain a copy of the article "Strength of Glued Sheet Metal," by N. A. DeBruyne from the issue of Aug. 24, 1944.

R. L. SHELTON,
Director of Purchases
Gates Rubber Co.,
Denver, Colo.

● Sending tear sheets.—Ed.

RUST PREVENTIVES

Sir:

We would like to obtain two copies of article on "Specifying Rust Preventives," in the June 7 issue.

D. A. WILSON,
General Purchasing Agent
Canadian Westinghouse Co., Ltd.,
Hamilton, Canada

● Copies have been sent.—Ed.

ROBOT BOMB ENGINES

Sir:

Kindly send a reprint of the article "Manufacture of Robot Bomb Engines," by S. H. Brams from the Feb. 1 issue.

M. R. WOOD,
Director of Engineering & Research
General Aircraft Equipment, Inc.,
South Norwalk, Conn.

● Tear sheets have been mailed.—Ed.

PRECISION THREAD ROLLERS

Sir:

. . . . . we intend to place an order for rolled threads and would appreciate a listing of producers.

L. S. WISE
Beach Air Brush Co.,
Paterson, N. J.

● Producers of rolled threads are: Chevrolet Div. of General Motors Corp., Bay City, Mich.; Ford Motor Co., Dearborn, Mich.; Holo-Krome Screw Co., Hartford; Lamson & Sessions Co., Cleveland; Nash-Kelvinator Co., Kenosha, Wis.; Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.; R & M Engineering & Mfg. Co., Passaic, N. J.; Rockford Screw Products Co., Rockford, Ill., and Western Electric Co., Hawthorne, Chicago.—Ed.

SHOT PEENED SURFACE

Sir:

We have seen your article on "Shot Peening" by H. F. Moore and O. J. Horger from the Apr. 5 issue. We would like to use in the house organ of the Kropp Forge Co. the five illustrations showing the surface contour and microstructure of fatigue specimens and shot peened metal.

S. J. BORCHERS,
Editorial Staff

● We are attaching the cuts for your use.—Ed.

CONTINUOUS CASTINGS

Sir:

We have read the article on continuous casting by editor, T. W. Lippert in your issue of April 14, 1940 and should appreciate being referred to the inventors of the different processes or the owners of their licenses.

BROR HANSSON
Aktiebolaget Liljeholmens Kabelfabrik
Stockholm 9, Sweden

● We have sent the inquiry to makers of continuous casting equipment.—Ed.

ABSTRACTING AUTHORIZED

Sir:

We are planning to publish a house organ and wish to incorporate certain articles of merit which have appeared in trade papers. We have a clipping library which goes back about seven or eight years in which we find many articles from THE IRON AGE. We would like to have your permission to reprint some of these.

E. H. KING,
General Manager
Hill & Griffith Co.,
Cincinnati 4

● We cannot give permission to republish full articles even if credit is given, but a short abstract of any article would be satisfactory. This is general practice in the publications field.—Ed.

NEW ELECTRODE SPECS

Sir:

Industry in general, and the welding industry in particular, are and have been greatly handicapped by the lack of a real technical standard covering electrodes. True, there has been in existence for some years a so-called standard which might be termed a buyers' guide, known as Tentative Specifications published by the AWS. However, even in this long and complicated buyers' guide there are so many discrepancies with ambiguous and contradictory statements that it is rendered entirely unsatisfactory. Let me cite a few examples.

To qualify any electrode for any cated and so costly as to render them useless in manufacturing practice. They are too costly to be repeated periodically as a check on manufacturing standards. Tests are required on all sizes of 5/32 in. and above, but no tests are required on ⅛ and smaller so why have tests on *each* larger size?

A manufacturer cannot use the same electrode for two or more classifications; this in spite of the fact that the ideal electrode, of course, is one which would fulfill all classifications. Then there are specifications as to the electrical resistance of the coating, which certainly has nothing to do with the performance of the electrode.

Also it says: "The coating shall not have scabs, blisters, abnormal pockmarks, bruises, or other surface defects that shall be injurious." Just what is injurious?

These are only a few of the idiosyncrasies of this buyers' guide. Therefore, it can readily be seen that what is needed is a simple, easily understandable standard which would enable a manufacturer to manufacture to such standards consistently and would enable the purchaser readily and easily to test the electrodes if he wished to do so, to see if the manufacturer was conforming to standards.

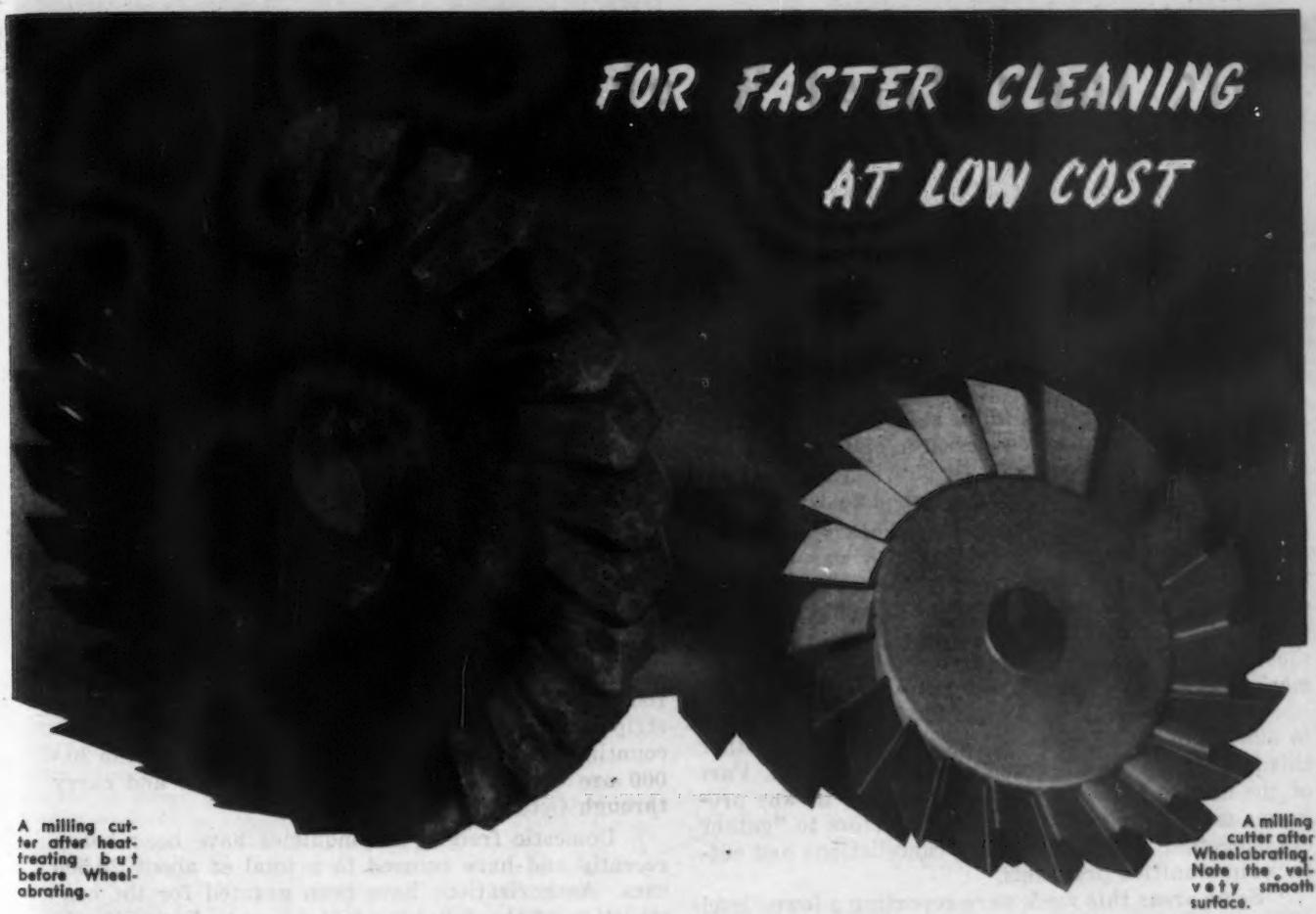
Since there is no need for a weld stronger or better than the material to be welded, I suggest for mild steel, which covers 90 pct of the requirements, a simple standard something as follows: The electrode shall be of such characteristics that it will withstand the following tests to be made any time a buyer might desire: (a) A weld made in ⅜ in or ½ in. plate of mild steel, planed to the same thickness as the parent metal, must break outside of the weld when pulled in a standard tension machine. (b) On a section from the same plate mentioned in (a), welds to be bent in any way desired and elongation of 25 pct in the outside fibers must show no fracture.

It is quite evident that an electrode which will perform as indicated in these two tests will give a weld equal in physical qualities to the plate. With such a weld, obviously the matter of porosity is of no consequence. However, if it should be desired to cover the question of porosity, a simple test could be made as follows: A fracture shall be made through the weld. On a straight line through the fractured weld there shall be voids of no more than 5 pct cumulatively.

There is no question but that an electrode which will withstand the above very simple tests will be satisfactory in welding mild steel, so why complicate matters. It seems to me that this is a question to which the Filler Metal Committee of the American Welding Society should give proper attention.

J. F. LINCOLN,
President
Lincoln Electric Co.,
Cleveland

FOR FASTER CLEANING AT LOW COST



A milling cutter after heat-treating but before Wheelabrating.

A milling cutter after Wheelabrating. Note the velvety smooth surface.

Wheelabrate HEAT-TREATED PARTS

The Perfection Tool and Metal Heat-treating Company of Chicago, using three airless Wheelabrator Tumblasts, reports that these machines speedily and efficiently remove scale deposited on tools and parts, both after heat-treating, and in preparation for it. They have found that Wheelabrating produces a velvety appearance that eliminates a great deal of expensive grinding.

The Wheelabrator Tumblast cleans batches of parts quickly, using minimum power and without damaging pieces of thin section. It employs the exclusive American endless apron conveyor principle of tumbling which provides *complete* exposure of all work to the action of the blast stream. Unloading is accomplished by simply reversing the conveyor. No other tumbling method can match the effectiveness of this design.

The performance of the Wheelabrator Tumblast as a time-saver and cost-cutter has long been recognized in hundreds upon hundreds of plants. In planning for business now or in the post-war period, investigate airless Wheelabrator equipment. Write now for full details.

Operator inspecting a Wheelabrated gear in a 27" x 36" Wheelabrator Tumblast.

American FOUNDRY EQUIPMENT CO.

510 S. BYRKIT ST.
MISHAWAKA, IND.

WORLD'S LARGEST BUILDERS OF AIRLESS BLAST EQUIPMENT

This Industrial Week . . .

- ***Hectic Sheet Market Condition Expected***
- ***Domestic Freight Car Inquiries Heavy***
- ***Ingot Rate Unchanged at 89.5 Pct.***

SIGNS are multiplying in the steel industry that the period of partial reconversion to civilian steel output will be almost as hectic as when the industry went from civilian production of steel to war output.

Although backlogs continue to be heavy and represent substantial tonnages of rated or war business, much of this unshipped material is vulnerable to future cancellations and changes in the battlefronts. Much of this tonnage is also for extended delivery. Currently, the order situation reflects a myriad of conflicting market trends.

In the past week the volume of rated steel business in almost all districts was down sharply, but whether this indicates a definite trend remains to be seen. Part of the decline is probably due to changes in war programs and to the necessity for contractors to "gather ends together" after a series of cancellations and cutbacks in munition programs.

Some areas this week were reporting a lower level of civilian steel order volume. This was to be expected inasmuch as steel companies so far have been unable to give definite commitments for large-scale deliveries of steel for civilian purposes in the third or even the fourth quarter. The situation is extremely tight in the flatrolled market, with about 75 pct of the nonrated tonnage booked involving sheets.

The sheet situation will be the problem to which the WPB will have to find a solution soon if the distribution of steel orders is to proceed so that steel mills will not be faced with lower operations and lack of control at a time when potential steel demand remains at a high point. The freezing of most sheet schedules for the third quarter is the first step by the WPB in an attempt to get a semblance of order in the sheet market.

All sheet orders, shipments and cancellations for the third quarter will be under strict WPB control until a study is made of the data now being collected covering third quarter sheet commitments by the mills. No open space on sheet mills with but few exceptions may be filled without specific WPB approval. As long as this freeze continues, it nullifies the permission, as far as sheets are concerned, for mills to accept unrated business in accordance with a previous WPB order.

Attempts so far by the steel industry and the WPB to find the exact cause for the chaotic sheet condition have uncovered little concrete information. It is believed by some that sheet mills have been overloaded on product directives and that this coupled with the failure of cancellations to materalize quickly has brought the present tight situation. Other factors which have tended to prohibit anything but a small trickle of steel to civilian producers include manpower shortages in specific skills, a substantial increase in the number of outlaw strikes, hot weather and the forcing down of some steel units for urgently needed repairs. Declines in production because of these factors have the effect of substantially increasing the backlog of rated steel business.

ADDING to the requirements for rated strip orders is a contract placed recently for 30,000 portable army shelters with bids to be out for another 200,000 of these units on Nov. 1. Of the 30,000 already ordered, 28,000 will have aluminium roofs, 1000 will have steel roofs and 1000 plywood roofs. About 600 lb of steel strip is involved in the construction of each unit discounting those with steel roofs. Deliveries on the 30,000 are expected to begin about Sept. 1, and carry through October.

Domestic freight car inquiries have been heavy recently and have boomed to a total of about 22,500 cars. Authorizations have been granted for the construction of the following freight cars: Pennsylvania R.R. to build in its own shops 300 70-ton covered hopper cars, 100 each to be built in January, February and March 1946; Mount Vernon Car Co., 250 50-ton box cars for the Consolidated Ry. of Cuba to use first quarter 1946 materials.

The following inquiries are out for 1946 construction: Chicago & Eastern Illinois Ry., 200 50-ton box cars; Rock Island R.R., 1000 50-ton auto box cars; Erie R.R., 1400 of various types; Illinois Central R.R., 1800 of various types, and Merchants Dispatch, 500 40-ton refrigerator cars.

THE following inquiries are in the process of preparation and will be submitted for approval shortly: 500 50-ton box cars for the Baltimore & Ohio and 500 70-ton hopper cars for the same road; 1000 70-ton hopper cars for the Bessemer & Lake Erie R.R.; 300 40-ton refrigerator cars and 2500 50-ton box cars for the Grand Trunk of the Canadian National; 1200 50-ton box cars for the Burlington R.R.; 700 70-ton hopper cars for the Delaware & Lackawanna R.R.; 200 50-ton ballast cars and 25 70-ton covered hopper cars for the Denver & Rio Grande R.R.; 1000 50-ton box cars and 1000 70-ton covered hopper cars for the Louisville & Nashville R.R.; 500 50-ton box cars for the Norfolk and Western R.R.; 750 70-ton covered hopper cars for the New York Central R.R.; 500 50-ton box cars for the Reading Road; 250 50-ton box cars and 50 50-ton flat cars for the St. Louis & Southwestern R.R.; 1000 50-ton box cars for the Southern R.R., and 50 70-ton covered hoppers for the Western Maryland R.R.

Strikes, repairs and hot weather have combined this week to keep the steel ingot rate unchanged from last week at 89.5 pct of capacity.

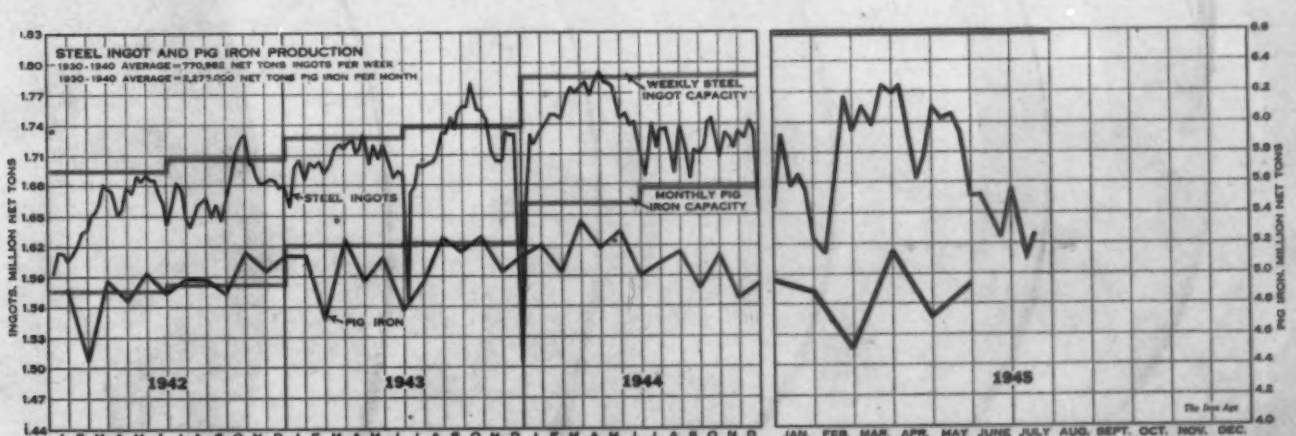
• **WAREHOUSE ORDERS**—Warehouses in Chicago are accepting unrated orders freely although rated orders still constitute the larger part of the volume in most cases. Warehouses are well protected on mill books through the balance of this year and into the first quarter of 1946, and are willing to gamble on easing of mill order books by that time sufficient to allow replacement of steel sold without rating. Inventories were greatly depleted during February, March and April, the biggest volume months in history, and only gradually are beginning to fill up. Elimination of ceilings on warehouse directives with mills will help the situation materially, warehouses in Chicago believe. Secondary preference ratings received from customers automatically entitled to use them are buttressing CMP orders received by the warehouses substantially. Some warehouses have been able to place small amounts of unrated business with mills.

• **CANADIAN STEEL OUTPUT**—Canadian production of steel and pig iron for the month of May showed a decline from the previous month, while output of ferroalloys rose to a new record for the year. Output of steel ingots and castings in May held an average of 89.9 pct of total capacity for a total of 267,643 net tons and compares with 92.07 pct or 274,213 net tons in April and 263,431 tons in May, 1943. The month's output included 254,629 tons of steel ingots and 13,014 tons of steel castings. Charges to steel furnaces included 130,727 tons of pig iron; 70,990 tons of scrap of companies' own make and 93,047 tons of purchased scrap. For the five months ending May 31, cumulative production of steel ingots and castings amounted to 1,338,503 net tons compared with 1,271,833 tons in the corresponding period of 1944 and 1,259,652 tons in 1943. Production of pig iron in May totaled 155,574 net tons, for an average rate for the month of 66.1 pct of rated capacity compared with 156,070 or daily average rate of 68.5 pct in April, and with output of 175,207 tons in May, 1944. The month's output included 128,959 tons of basic iron of which 8398 tons were for sale and the balance for further use of producing firms; 13,654 tons of foundry iron, all for sale and 12,961 tons of malleable iron all for sale. Blast furnace charges in the month included 280,483 tons of iron ore; 16,399 tons of mill cinder, scale and sinter, etc., and 8577 tons of scrap iron and steel. In the first five months of the year pig iron production totaled 782,917 net tons which compares with 627,343 tons in the same period of 1944 and 719,900 tons in the 1943 period.

• **LABOR SHORTAGE AREAS DECLINE**—The number of Group I labor shortage areas in the country is expected to decline rapidly, the War Manpower Commission said recently. The July WMC report on the adequacy of labor supply, measured against demand, showed that of the 302 classified areas in the country, 53 remain in Group I, as compared with 66 a month ago.

• **GRAY IRON CASTING DEMAND**—New gray iron castings requirements for essential civilian needs, superimpose on a five-months war order backlog of 2,500,000 tons, are expected to keep most foundries busy for several years, Gray Iron Casting Industry Advisory Committee members and War Production Board officials concluded at a recent meeting, WPB said recently. Committee members declared that even the war programs could not be completed on schedule unless deferments of skilled foundry workers are continued. War and war-supporting programs are still taking almost 100 pct of current production and to these requirements is now added the pent-up demand for authorized products, such as textile machinery, refrigerators, washing machines and other consumer durable goods. The total demand for gray iron castings is expected to keep most foundries at peak production for a number of years, committee members said.

• **SHEET SCHEDULES FROZEN**—Searching for relief from a tight situation, WPB has frozen third quarter rolling mill order books for certain types of sheet and strip until it has made a study of all orders validated or to be produced in that period. As soon as the full effect of this action is evident and open space is apparent, books will be reopened for orders. The freeze which prohibits any new third quarter sheet and strip business, is one of a series of moves designed to spread the available supply among metalworking industries and to prevent sheet and strip from becoming a reconversion bottleneck, WPB said.


STEEL INGOT AND PIG IRON PRODUCTION
1930-1940 AVERAGE = 770,985 NET TONS INGOTS PER WEEK
1930-1940 AVERAGE = 2,273,000 NET TONS PIG IRON PER MONTH
WEEKLY STEEL INGOT CAPACITY
MONTHLY PIG IRON CAPACITY
STEEL INGOTS
PIG IRON
INGOTS, MILLION NET TONS
PIG IRON, MILLION NET TONS
1942
1943
1944
1945
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

Steel Ingot Production by Districts and Per Cent of Capacity

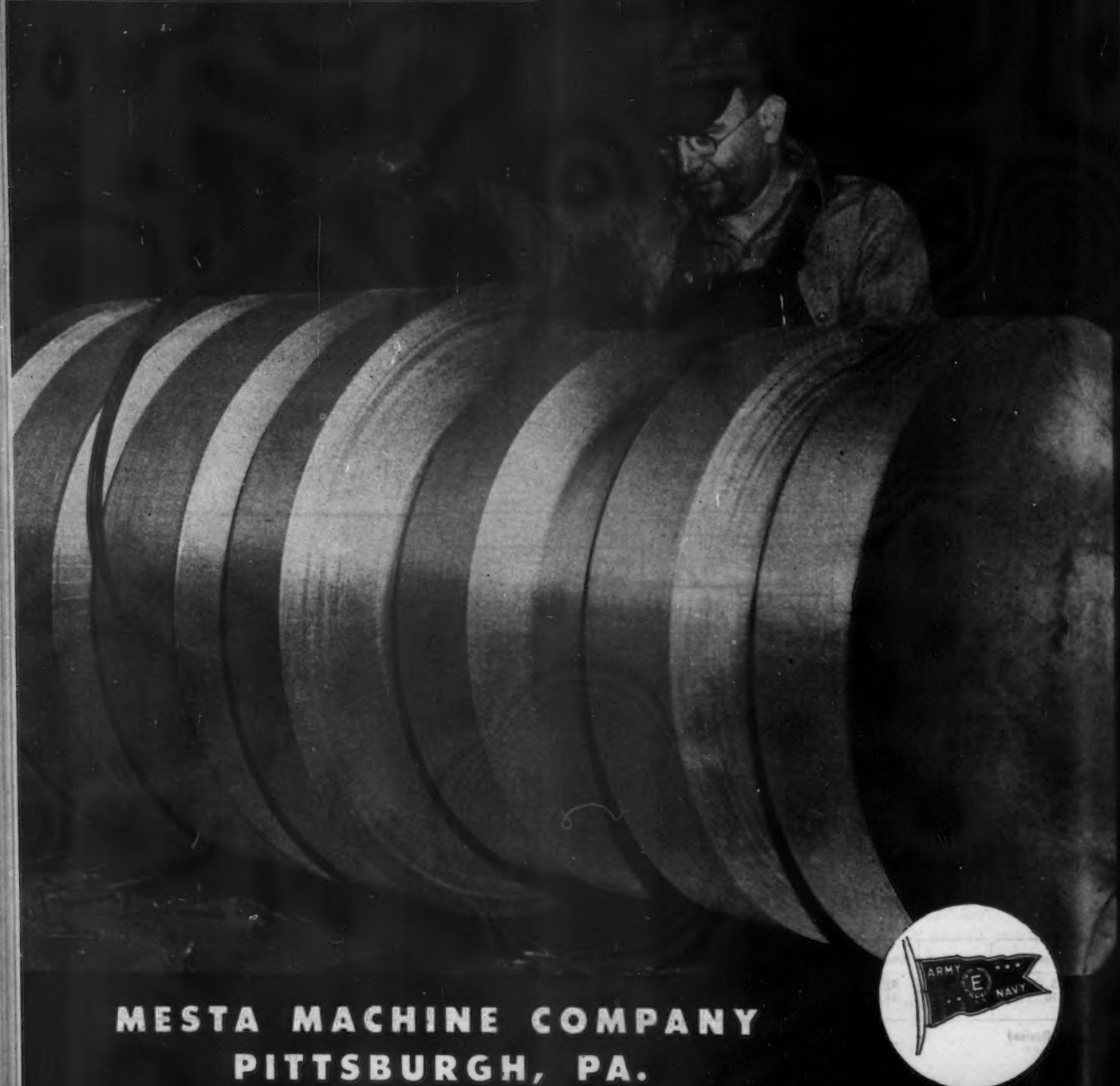
Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
July 3.....	83.5*	92.0*	90.0*	93.0	92.5	93.0*	90.0	95.0	93.5	79.0	95.0	75.0	90.0	89.5
July 10.....	89.0	94.5	90.0	93.0	79.0	104.5	90.0	95.0	89.5	69.0	95.0	83.0	93.0	89.5

* Revised

THE MIGHTY SEVENTH—
Let's Put it Over!

MESTA ROLLS

TURNING A MESTA SPECIAL ALLOY STEEL STRUCTURAL MILL ROLL USED IN PRODUCTION OF 4 INCH CHANNELS.



ARMY E NAVY

MESTA MACHINE COMPANY
PITTSBURGH, PA.

WPB Four-Point Program Attempts To Combat Tight Flatrolled Situation

Washington

• • • Detailing the WPB order effective July 9, which reduces permissive inventories of steel sheet and strip from 60 to 45 days, Chairman J. A. Krug has announced a four-point program designed to spread the available supply among metal working industries and to prevent steel sheet and strip from becoming a more serious reconversion bottleneck.

The steps outlined by the WPB Chairman included: (1) Inventory and purchase order investigations by WPB field staff particularly aimed at sheet steel; (2) a drive to bring about a more effective use by manufacturers of sheet and strip inventories; (3) efforts to increase present production through expansion of flat rolled finishing facilities and recruitment of needed manpower; (4) re-screening of third quarter and proposed fourth quarter steel allocations, including export and lend-lease requirements and shipments, so as to conform with the needs of a one-front war.

Investigation of inventory and order position of the larger steel users will be the first order of business for WPB field and compliance representatives, Mr. Krug said, pointing out that a careful survey will be made to determine whether or not military cutbacks are being promptly reflected by order cancellations at the steel mills. Those cases involving switch-over of orders from products in relatively easy supply to those which are tight, particularly steel sheet, will be investigated at both the steel mill and plant levels.

"During the next four months, the steel industry will produce at present production rates about 2,400,000 tons of sheet and strip steel of the gages that are presently in tight supply," said Mr. Krug. "With additional manpower recruited for the sheet and strip mills, 80,000 tons more per month could be produced with present facilities or nearly enough to take care of reconversion needs estimated at 85,000 tons of sheet and strip per month."

Proposed expenditures of $55,000,000 by private industry for the new flat rolled finishing facilities includes 39 projects costing approximately $34,000,000 which have been approved and additional cases involving $21,000,000 are under consideration. Mr. Krug also stated that all hot strip mill units formerly rolling plates have resumed full production of sheet subject to: (1) Limitations on finishing capacity and available manpower, and (2) those plate requirements that cannot be produced on other than strip mills due to necessary extra-deep drawing and pickling.

Idle and excess stocks of sheet steel created by recent military cutbacks now in the hands of munitions contractors must be put to work in reconversion industries, Mr. Krug emphasized, while pointing out that the procurement services of the armed forces are in full agreement with this policy, have cooperated in its development and will gear their procurement schedules, contractors' inventories and redistribution of excess requirements or inventories to the WPB program.

The reduction of permissible inventory for sheet and strip steel (THE IRON AGE, July 5, p. 104) was ordered by Direction 24 to CMP Regulation 2. The direction carried the usual WPB protection for the small customer by allowing consumers with a monthly use not exceeding 25 tons to carry up to a 60 days' supply. All other sheet and strip steel users must, by July 9 cancel, reduce or defer any orders which have been placed, where the scheduled delivery would result in an inventory in excess of 45 days' supply.

WPB Freezes Third Quarter Mill Order Books on Some Sheet and Strip

Washington

• • • Searching for relief from a tight situation, WPB has frozen third quarter rolling mill order books for certain types of sheet and strip until it has made a study of all orders validated or to be produced in that period. As soon as the full effect of this action is evident and open space is apparent, books will be reopened for orders.

The freeze, which prohibits any new third quarter sheet and strip business, is one of a series of moves designed to spread the available supply among metalworking industries and to prevent sheet and strip from becoming a reconversion bottleneck, WPB said.

In order to obtain concrete information regarding all open spaces on mill schedules, WPB sent telegrams on July 4 to all mills producing sheet and strip, requiring them to report to the Steel Division each week on the cancellations of all orders validated or to be produced in the third quarter.

The orders are to be listed by the month for which they are validated and in the five grades listed, as follows:

Plain hot rolled sheet and strip, 16 gage and lighter.

Hot rolled pickled sheet and strip, all gages.

Cold rolled sheet and strip, all gages.

Galvanized sheet, all gages.

Silicon sheet and strip, all gages.

WPB said the open spaces are expected to result from military cancellations and recently ordered reduction in permitted inventories of sheet and strip from 60 days' supply to 45 days' supply as required by Direction 24 to CMP Regulation No. 2.

Tonnage from expanded flat rolled finishing facilities, which will involve $55,000,000 financed by producers, it has been pointed out, will depend a great deal on the duration of the war. Some of the expansion will entail only relatively minor additions, while others call for major equipment needs and still others are said to call for two completely new mills to replace some of the handmills that were dismantled. In the case of new mills reports from the trade say that even under the best circumstances—not now prevailing—such as labor and priorities for material and equipment they would not be ready for production in less than nine months. It also was pointed out that even with adequate capacity existing it cannot be used to the full and won't be until 35,000 more sheet and strip mill workers can be engaged.

Foreman's Assn. Seen Gaining Ground in Steel Organizing Drive

By STANLEY H. BRAMS

Detroit

• • • Petitions for bargaining elections under the National Labor Relations Board in six steel plants in the Pittsburgh area, filed late in June, call attention to the sharp gains the organizing effort of the Foreman's Assn. of America, independent union, has made in recent months in the steel industry.

The FAA now has established 46 chapters in as many steel plants, this total being about a fifth of the number of chapters organized so far. The union claims a membership today of upwards of 40,000 supervisors, and on the basis of the proportion of steel chapters there would be indicated the organizing of somewhere around 8000 foremen in steel and related industries.

Indicative of the organizing drive being put on in the steel industry by the Foreman's Assn. is the fact that regional offices have been set up at Chicago, covering Illinois, at Gary, covering Indiana, and at Elizabeth, N. J., covering the East. Inasmuch as steel is a basic industry which will not be affected by an ultimate reconversion away from war production, it is the subject of concentrated organizing work.

To date the Foreman's Assn. has been unable to secure bargaining conferences with any plant in the steel industry. Requests have been passed along to these plants whenever the union has deemed itself strong enough to ask for such meetings, but the position of the steel firms, like that of the auto industry in which FAA got its start, is that foremen are a part of management and hence are ineligible as bargaining units.

Although the FAA was organized in 1941, it did not issue a charter in the steel industry until March 11, 1943, when Great Lakes Steel chapter 15 was established at Ecorse, Mich. Since that time the fortunes of the FAA have been considerably improved by two recent judicial decisions affecting its right to function as a bargaining agency.

One of these was the decision by the NLRB that foremen were qualified to be represented in a bargaining unit, this decision overturning the celebrated Maryland Drydock Co. case which held the opposite viewpoint. Even more recently the Appellate Division of New York Supreme Court validated a decision of the New York State Labor Relations Board certifying the FAA as the collective bargaining representative for foremen at the Allegheny Ludlum Steel Corp. plant at Dunkirk, N. Y. Previously the foremen's union had won a bargaining election by top-heavy margin at this plant, conducted under the auspices of the State Labor Relations Board.

If the NLRB follows the precedent it has been establishing in Detroit automotive plants, it will shortly order bargaining elections in the six Pittsburgh area mills in which elections among the supervisors have been requested. These six are: Bethlehem Steel Co., Johnstown, Allegheny Ludlum Steel Corp., West Leechburg, two plants of the Crucible Steel Co., at Pittsburgh, Sharon Steel Corp., at Sharon, Pa., and the National Malleable Co., Sharon.

The substantial organizing effort in the Chicago-Gary area has resulted in the issuance of charters to these steel industry plants: Youngstown Sheet & Tube, East Chicago, Ind.; Gary Sheet & Tin Mill, Div. of Carnegie-Illinois, Gary; Gary Works of Carnegie-Illinois, Gary; Inland Steel Co., Indiana Harbor; American Steel Foundries Co., East Chicago; Acme Steel Co., Riverdale, Ill.; Allied Steel Castings Co., Harvey, Ill.; American Steel Foundries Co., Granite City, Ill.; South Works of Carnegie-Illinois, Chicago; Republic Steel Corp., Chicago.

In the Pittsburgh area charters have been issued to Carnegie-Illinois at Farrell, Pa.; Bethlehem at Johnstown; National Tube Co. at McKeesport; Sharon Steel Corp. at Sharon; Crucible Steel Co., at Pittsburgh; National Tube Co. at Ellwood City; Allegheny Ludlum at West Leechburg; Crucible Steel Co. at Midland; Bethlehem Steel Co. at Bethlehem; and Crucible Steel Co. at Pittsburgh.

Mills organized in the Cleveland area include the 98-in Strip Div. of Republic at Cleveland, and the Truscon Steel Div. at Cleveland.

Organizing effort around Buffalo has netted chapters at Bethlehem Steel Lackawanna Works; Allegheny Ludlum at Dunkirk; Republic Steel at Buffalo; Wickwire Spencer Steel Co. at Tonawanda; Donner Hanna Coke Corp. at Buffalo and others.

Other scattered steel industry plants which have FAA chapters include Chevrolet Forge at Detroit; Michigan Steel Tube Co. at Detroit; American Steel Castings Co. at Newark; Lakey Foundry Co. at Muskegon, Mich.; American Steel and Wire Co. at Duluth, Minn.; and Wheeling Steel Corp. at Wheeling, W. Va.

MINE DETECTING: *Sappers uncover a Teller mine with the aid of compressed air. This is done by blowing air at a pressure of approximately 50 psi through a tube of about ½ in. in diam. The stream of air blows off the top soil and any loose earth covering the mine.*

CF&I Estimates 2 to 20 Months Required for Added Geneva Facilities

Denver

• • • Additional facilities at the Geneva Steel plant proposed by Colorado Fuel & Iron Corp. in its request to Defense Plant Corp. to lease the big Utah mill would create an additional market potential of 152,000 net tons of finished steel products, according to CF&I studies. (See THE IRON AGE, July 5, 1945, p. 105.)

Modifications to the plant proposed by CF&I, which would provide an ultimate finished steel capacity of 700,000 net tons annually would create a new market potential of 78,000 net tons of sheet and strip, 43,000 tons of plates, and 31,000 tons of structurals, according to the Colorado firm's study.

"Additional support of the estimated distribution at Geneva's products can be realized from an intensive export program, which CF&I recommends," the study laid before DPC states. "After proper sales and market development, approximately 100,000 tons of export sales annually can be anticipated as a new market potential for Geneva."

"CF&I estimates that the products from Geneva's present facilities have a maximum normal peacetime market of not more than 225,000 tons. Therefore only one-third of Geneva's present estimated capacity of finished products could be distributed in the form of plates and structurals, the present products of the mill, until additional facilities are installed.

"If the Geneva's plant were operated on the basis of only one-third of its producing capacity, substantial losses would result, and would continue until new facilities were added to produce the products recommended by CF&I.

New facilities proposed, which CF&I recommends that DPC furnish before the lease be concluded, would cost $73 million according to the study. The time necessary for completion of the new equipment is estimated at two to four months to modify the present structural mill for rolling H beams, piling, large standard beams and channels in addition to present structural products, six to eight months for installation of additional stands to produce hot rolled coils from the present plate mill; 8 to 12 months for facilities to produce hot rolled coils from the present plate mill; 8 to 12 months for facilities to produce cold reduced sheets and tinplate; 14 to 20 months for complete plate mill conversion; six to eight months for a buttweld pipe mill; 8 to 12 months for a railroad freight car manufacturing plant; four to six months for a railroad steel car wheel plant; four to six months for a railroad car axle plant; and four to six months for a railroad flat leaf and helical spring plant. In a seven volume proposal submitted to DPC, CF&I lists seamless pipe, castings and forgings as other products having market possibilities in the Geneva market area, but does not now recommend installation of facilities for their production.

Among other reasons submitted for which it believes the DPC lease should be approved, CF&I states that it is "the largest owner of high quality iron ore deposits in the state of Utah, and is ready to utilize its reserves for the Geneva Steel plant operation." The Colorado firm also states that it has made a complete survey of western markets for Geneva products which can be used immediately.

The firm states that it has contacted and received commitments from several manufacturers who would establish plants in the vicinity to utilize substantial quantities of Geneva's products. In the communication to DPC, CF&I complains that it has been at a disadvantage in preparing its study in that it has only limited operating information with respect to the Geneva plant. "In contrast, the United States Steel Corp. has intimate knowledge of its present developments and operations," it is stated.

CF&I is, therefore, at a disadvantage and cannot complete all of its studies until such time as it has acess to the plant and the operating records, the communication declares.

Weirton Installing Cold Reduction Mill

Pittsburgh

• • • In line with the rapidly developing program of expansion of flat rolled facilities in the steel industry, the Weirton Steel Co. this week confirmed the report that it was purchasing a new tandem cold reduction mill to add to present production facilities at the Weirton plant.

The mill, to be built by United Engineering & Foundry Co., will be a four-high, five-stand unit, for rolling lighter gages of strip steel. The cost of the equipment was not disclosed, and the contract calls for delivery as soon as possible.

The mill is expected to be one of the fastest of its type in existence, with high speed being one of the important characteristics of the mill.

RUSSIAN IRON ORE: *Crushed ore is sent to the Kuznetsk blast furnaces in Russia to render smelting easier. The woman locomotive driver is taking the ore to the crushers.*

Munition Cutbacks Affect 3050 Workers On 110 Prime Orders

Cleveland

• • • Another small bite was taken from the plump munitions program this week affecting at least 3050 workers in the plants of 110 prime contractors scattered throughout the country.

Following a one-day meeting here, the War Dept. through the medium of the Cleveland Ordnance District announced that out of the 110 plants affected, only 25 are involved to the extent of releasing 50 or more employees. While no estimate is available as to the number of workers affected in subcontractors' plants, the 3050 employees of prime contractors will be released between now and October 15.

According to the announcement, only six of the 110 plants affected received complete contract cancellations, and large potential capacity for the manufacture of the affected items will be retained by most of the plants so that immediate full scale manufacture may be resumed without delay in the event of possible emergency needs in the future. At least two of these plants, Linderme Tube Co., and the Cleveland Welding Co., both of Cleveland, have been engaged in rocket production.

Following are plants showing employees affected, where it is estimated 50 or more employees will be released between now and October 15:

Maddox Foundry, Archer, Fla., 50
Linderme Tube Co., Cleveland, 140
Cleveland Welding Co., Cleveland, 300
Lloyd Mfg. Co., Menominee, Mich., 80
Simmons Co., Elizabeth, N. J., 100
Chas. D. Briddell, Inc., Crisfield, Md., 65
Revere Copper & Brass Co., Rome, N. Y., 125
Kingston Products, Kokomo, Ind., 175
Continental Die Casting Co., Detroit, Mich., 200
Kyle Corp., South Milwaukee, Wis., 65
Kennedy-Vansauen Mfg. & Eng. Corp., Danville, Pa., 151
U. S. Machine Corp., Lebanon, Ind., 135
Columbia Electric Co., Spokane, Wash., 50
Electric Products Consolidated, Seattle, Wash., 120
Industrial Aircraft, Los Angeles, Cal., 50
Allen-Wales Adding Machine Corp., Ithaca, N. Y., 90
Kane Products, Inc., Shelton, Conn., 50
Iron Fireman Co., Portland, Ore., 60
Cavalier Corp., Chattanooga, Tenn., 50
Century Engineering Co., Cedar Rapids, Iowa, 140
Beam Mfg. Co., Webster City, Iowa, 80
Central Can Co., Chicago, Ill., 50
Associated Mfg. Co., Waterloo, Iowa, 100
Texas Steel Mfg. Co., Fort Worth, Tex., 150
Budd Wheel, Detroit, Mich., 50

Representatives of the Army, Navy, War Manpower Commission, War Production Board, Smaller War Plants Corp., and the Maritime Commission, sitting as the Production Readjustment Committee of the War Production Board, approved the readjustments prior to their announcement.

Tank Casting Output Replaced by RR Order

Buffalo

• • • The Pratt & Letchworth Co. has suspended production of castings for the M-26 (General Pershing) tanks because of sharply reduced schedules for that weapon. The plant, however, will continue at capacity, according to a company spokesman, with heavy orders for railroad equipment filling the gap. The company also is producing castings for 8-in. howitzers being turned out at the Watervliet Arsenal.

The suspension of tank casting output may be only temporary, the spokesman said, and production may be resumed shortly on a limited scale after the prime contractors complete inventories of materials on hand.

NO LONGER DEADLY: *A mass of surrendered German U-Boats moored at Lisahally in Northern Ireland.*

Warren City Mfg. Co. Heads Farm Equipment Division for Graham

Warren, O.

• • • The Warren City Mfg. Co., subsidiary of Graham-Paige Motors Corp., will be headquarters for the farm equipment division of Graham, manufacturing and selling the Rototiller, along with a new type of tractor, and other agricultural machinery.

Vern R. Drum, vice-president and general manager of the plant, heads the operations of the new agricultural division. W. A. MacDonald, vice-president, is in charge of the sales staff and Truman F. Schrag is chief engineer. A staff of 15 engineers have arrived from the Detroit Graham plant to prepare, tool and design the farm equipment for production.

As part of this agricultural program, Warren City plans to operate an experimental farm nearby to test and develop new machinery.

Outlaw Strike Costs 25,500 Tons of Steel

Chicago

• • • Following a loss of over 25,000 tons of steel ingot production, two strikes at the South Works of Carnegie-Illinois Steel Corp. reached a settlement on Friday, July 6. The first strike started six days earlier when maintenance workers on night shifts objected to readjustments in schedules which cost them certain of their shift differential pay. The second strike, which started when the first was settled and lasted only 24 hrs., was a direct outgrowth of the first.

When the first work stoppage caused the layoff of interplant railroad employees, the crews were laid off on the basis of crew seniority rather than overall seniority, and as a result, when the maintenance workers returned to their jobs the railroad employees went out.

Their strike, which caused a complete stoppage of steelmaking operations, lasted from July 5 at 11 P. M. until the same hour the next day and accounted for 10,500 tons of the production loss. The five-day strike which preceded it cost 15,000 tons of ingots.

During the second strike 36 out of 39 openhearths and seven blast furnaces went out of production.

Component Cutbacks Proportionate To Recent Shell Cuts

Pittsburgh

• • • Reverberations of the recent cutbacks in heavy artillery shells were felt here in many component items. Cannister, booster, fuse, and cartridge storage case producers in this area were all cut back proportionate to the recent cuts in shell schedules.

The Tracey Mfg. Co., Pittsburgh, which had been making 30,000 cartridge storage cases per month, M-19, was cut to 20,000 in July, and 10,000 per month from August through April, 1946. The equipment in the plant will be maintained as standby equipment.

Hancock Mfg. Co., New Cumberland, W. Va., had had a contract to make 40,000 75-mm ammunition containers per month, but had never reached that production schedule because of a fire. However, this schedule was cut to 10,000 in July, 10,000 in August, and then the contract ended. It is likely, however, that the company may ask for an immediate complete cancellation.

Palley Mfg. Co., Pittsburgh, had a schedule for 50,000 cartridge storage cases, M-19, per month, and will continue on that schedule through August. At the end of August, the contract will be terminated.

Westinghouse Airbrake Co., Wilmerding, Pa., had been producing 10,000 M-110 fuses per month. That contract was canceled completely. Titan Metal Co. had a schedule for a heavy artillery shell time train ring that called for 600,000 per month. This was cut to 400,000 per month through April, 1946.

Wolverine Mfg. Co., Pittsburgh, will finish a schedule for 30,000 37-mm cannisters in July.

Robertshaw Thermostat Co., Youngwood, Pa., was cut from 750,000 to 400,000 M-21-A-4 boosters from August on through April, 1946. Also, on a schedule for 450,000 M-25 boosters per month, the contract was canceled completely after August. These boosters are made from brass rods, and it is believed at peak operation, Robertshaw was the biggest user of brass in the United States if not the world.

Pressed Steel Plans To Enter New Field

Chicago

• • • Plans of Pressed Steel Car Co., Inc., to enter the household appliance and equipment field were indicated in a statement mailed to stockholders.

A special meeting of stockholders was called for Aug. 2 to vote on an amendment to the articles of incorporation to permit the company to "manufacture, buy, sell and deal in household appliances and equipment, heating equipment, air conditioning equipment, refrigerating equipment and all other articles of commerce of a similar or cognate nature."

Appliance manufacture would be centered at the company's Hegewisch plant, near Chicago, which manufactured freight cars until December 1937. The plant then was idle until 1940 when it commenced production of tanks and ordnance equipment. Tank production at the plant now has halted and only a small portion is now in use in ordnance manufacture. In the proxy statement to stockholders, the company said an estimated expenditure of approximately $750,000 will be required to convert the plant to the manufacture of household appliances.

Krug Reports Munitions Monthly Production In 1944 Equals $5 Billion

Washington

• • • America's production front has more than kept pace with the world's battlefronts, J. A. Krug, chairman of WPB, said recently in submitting to the President his report on war production in 1944.

Mr. Krug pointed out that ever since the summer of 1943 the United States has produced more than $5 billion worth of munitions each month. "In 1944 alone," he said, "the country produced 96,359 planes, including 16,048 heavy bombers, built 30,889 ships, 17,565 tanks, 595,330 Army trucks, and produced 3284 heavy field guns and howitzers and 7454 light ones, 152,000 Army aircraft rocket launchers, 215,177 bazookas and 1,416,774 tons of ground artillery ammunition."

His report called attention to many outstanding wartime production achievements in the materials field; among them, the rise of synthetic rubber production from 8000 long tons in 1941 to 753,000 in 1944; the trebling of aluminum output between January 1942, and October 1944; the rise of magnesium production to 50 times the 1939 output; the 33 1/3 pct increase in steel production between 1940 and 1944; the 80-time increase in penicillin output from 1943 to 1944; the doubling of aviation gasoline production every year since 1941; and the 75 pct increase in generation of electric power between 1939 and 1944.

The WPB chairman reported that under CMP in 1944, direct military and export requirements absorbed 92 pct of the aluminum, 65 pct of the carbon steel, 81 pct of the alloy steel, and 90, 69, and 71 pct respectively of the brass mill, wire mill, foundry copper and copper-base products.

CAUGHT IN TIME: *Gun barrels (left) and locomotives (right) lie in the bomb-wrecked Krupp works at Essen, Germany, caught in Allied air raid. The guns were made for cross-channel fire at England.*

CIO Proposes Workers Run Willow Run Plant On Cooperative Basis

Detroit

• • • **Proposal that a worker's co-operative take over operation of the huge Willow Run bomber plant on lease and use it to produce railroad rolling stock for the present to relieve the transportation shortage, and later to build prefabricated housing, has been made by CIO United Automobile Workers Local 50, composed of employees of the plant, which shut down late in June on output of B-24 bombers.**

A proposal will be taken to Washington within the next few weeks by Walter P. Reuther, UAW vice-president, and Brendan Sexton, president of Local 50, calling for lease of the Willow Run plant to the worker co-op.

The broad plan developed by Local 50 calls for creation of a Railroad Equipment Production Authority which would buy the output of Willow Run, and in turn sell rolling stock to the railroads on a competitive basis or else lease them. It was expected that Willow Run could begin production within 90 days on rolling stock—freight cars, coaches and sleeper cars—and could almost immediately thereafter be producing in substantial volume.

The newest "Reuther plan" also calls for creation of a Housing Production Authority which would act as a distributing medium for prefabricated housing produced in war plants, whether Willow Run or others. This proposed authority would sell homes to individual homeseekers at a price permitting a small return on the government investment and would also develop low-cost housing projects in cooperation with federal, state and municipal agencies.

Operations of these two authorities, it was proposed by Reuther, would be financed by congressional appropriation as in the case of the TVA, using proceeds from sales of bonds and sales of products. He also suggested that Reconstruction Finance Corp. loans should also be available.

Truck Body Plant Expands

Buffalo

• • • **The Watkins Body Corp. has announced plans for a $35,000 addition to the plant in Genesee Pt. The new structure, according to president Albert C. Finley, will double the plant's productive capacity of motor truck bodies. The company, he said, is preparing for the "postwar period when Buffalo is going to be an important body producing center" for chassis coming here from Detroit. The company has resumed civilian production of truck bodies, with about 30 per cent of the output on war orders.**

Under New Amendment Unrated or Z Orders Require No Deferment

Washington

• • • **Steel producers will not have to defer unrated orders or "Z" orders on production schedules in favor of regular authorized controlled materials orders after expiration of the lead time, unless specifically directed to do so, the WPB announced.**

This action was taken in amending CMP Regulation 1 which previously required deferment of unrated or "Z" orders on producers' schedules in favor of authorized controlled materials orders in all cases prior to the lead time and also after the lead time unless such action would result in substantial production loss or interference with production.

Under the amended regulation, the lead times for steel in the listed controlled materials forms and shapes have been shortened to 30 days, except for the lead times on cold drawn tubing and wire rope which have been shortened to 60 days. Other controlled materials schedules remain unchanged, WPB pointed out.

Direction 54 to CMP Regulation 1 was amended to conform to Direction 73, issued June 30, which canceled all third and subsequent quarter ratings identified by the symbols "Z-1" and "Z-2".

To Head German Steel Units

Pittsburgh

• • • **Selected to assist in supervising part of the task of eliminating the German steel industry or converting it to peacetime production, two Carnegie-Illinois Steel Corp. officials have just left this country for their new posts.**

Peter V. Martin, director of industrial relations, Chicago district of this U. S. Steel subsidiary will head the blast furnace and coke section of the metallurgical division of the U. S. Government Control Council in the German area.

A. H. Chalmers, Jr., procedure engineer for the company in Pittsburgh will be production engineer for the ferrous and nonferrous metals group. Both will be under the direction of R. J. Wysor, former Pittsburgh steel official, lately president of Republic Steel Corp., Cleveland, who was recently chosen to head the metals program.

DIGGING FOR WATER: *Using captured Japanese equipment, seabees operate the pump room at the bottom of the initial shaft in a series of tunnels being dug on Guam by a Navy construction batallion to secure an additional source of water for the fleet. On the right is a small chain-bucket loader used to pile coral into carts.*

Eastern Aircraft Signs Navy's Pretermination

Washington

• • • **The first of the** kind to be executed by the Navy, a pretermination agreement for approximately $404 million in undelivered planes has been signed by the Navy Dept. and the Eastern Aircraft Div. of General Motors Corp. The agreement is designed to facilitate the settlement of terminated war contracts and reconversion of a war contractor's plant to other production when the Navy no longer requires specific war materials.

Negotiated by the Bureau of Aeronautics under the authority of the Army-Navy joint termination regulation, the agreement was approved by the Office of Procurement and Material.

By reaching agreement now on many matters which can be settled, the Navy Dept. said that it is believed ultimate settlement of the contract, whenever termination occurs, will be facilitated thus paving the way for prompt clearance of inventory and equipment from the company's five plants and aiding in conversion to civilian production.

The Navy pointed out that it may terminate the contracts with the Eastern Division at any time it decides that additional airplanes of the type being produced there are no longer needed. In advance cancellations, however, it has been possible to come to agreement on several basic questions, after negotiations extending over several months.

The agreement is comprehensive and is supported by detailed inventory sheets which describe and determine the disposition of individual inventory items.

In addition to establishing alternative stop-work points, the agreement covers the removal of components, method of taking and reporting inventories, classification of inventory, sales by contractor, disposition of special equipment and government - furnished equipment, treatment of completed items and agreed percentage of profits. Any new contracts awarded the company may be included in the agreement.

The Navy emphasized that execution of this agreement does not indicate that there is necessarily a likelihood of the termination of its airplane contracts in the near future. The Navy at present is negotiating with numerous other contractors for similar pretermination agreements in line with its policy to facilitate conversion from terminated war production to other war or civilian production.

WPB Lists Sequence For Scheduling All Unrated CMP Orders

Washington

• • • **The sequence in** scheduling unrated orders for steel was explained July 10 by WPB. Amending of the direction results from the open ending of CMP on July 1 to permit deliveries of controlled materials on unrated orders.

The amended direction states that when a producer of steel in controlled material form is unable to schedule all orders which he has accepted in the month for which he accepted them, he should select the orders to be placed on the production schedule according to the following preference: 1. Carried over and current orders required to be filled by specific direction of WPB; 2. Orders bearing symbol "FCN" (further conversion) and CMP orders carried over from previous months except orders with a CMP allotment symbol including the letter "Z" (deferred orders); 3. Current CMP orders except those carrying the allotment symbol "Z"; 4. CMP orders carrying the allotment symbol "Z" except stainless steel; 5. Unrated orders, including orders bearing the symbol "FCN".

Army Shelters Ordered Bids for 200,000 Out

Pittsburgh

• • • **Orders were placed** recently for 30,000 portable Army shelters and bids will be out for another 200,000 of these units on Nov. 1 of the 30,000 that have been ordered, 28,000 will have aluminum roofs, 1000 will have steel roofs, and 1000 will have plywood roofs. There are about 600 lb. of steel strip involved in the construction of each unit, discounting those with steel roofs.

American Elevator & Machine Co., Louisville, Ky., was awarded an order for 6000 of these units plus a share in another 3000 that were originally to be built by the Johnson Bros. Co., of Phoenix, Ariz. Aero Muffler Corp., Rockleigh, N. J., will build 3000; Berkey & Gay, Grand Rapids, Mich., will build 4000; Berger Mfg. Co., Canton, Ohio, will build 3000; Sneed Mfg. Co., Orange, Va., will build 3000; and Steelcraft Engineering Co., Cincinnati, will build 1000 plus the remainder of the original Johnson Bros. order. Allison Steel Co., Phoenix, Ariz., will build 3000 units and Berkeley Steel Co., Berkeley, Calif., will build 3000. The award of the remaining 1000 will be divided among these firms.

The deliveries of the original 30,000 ordered are expected to begin about Sept. 1, and carry through October.

X-RAY LAB: ***The X-ray laboratory at Warren City Mfg. Co., subsidiary of Graham-Paige Motors, is equipped to handle a variety of work including steel plate up to 4 in. in thickness. Two Westinghouse 220,000 v portable units are shown in the foreground and a third GE unit may be seen in the rear. The machine mounted on the overhead crane is a GE 400,000 v unit operated from a control board located in another room. Almost 13,000 X-ray exposures a month have been made in this laboratory.***

WPB Outlines Policy For Use in Granting Civilian Priorities

Washington

• • • **General policies** it will follow in granting priorities assistance for civilian production materials in the United States and Canada in the third and four quarters were outlined by WPB in its new Regulation PR-28. It also lists a number of special instances in which individual aid may be granted certain manufacturers. The order said that program levels will generally be no higher than previous levels established for the two-front war.

When "general" priorities assistance has already been granted for certain items for the third quarter, no further "general" assistance will ordinarily be given to individual manufacturers beyond the third-quarter level for additional or new production except under the following exceptions:

1. A particular L or M order may provide for increased production of the product controlled by the order during the third or fourth quarter. In such case, the order will describe who is elegible to apply, the time for filing and the applicable form.

2. Where manufacturers of a particular product are being given "general" priorities assistance, WPB, within the limits of available material, will give equitable treatment to newcomers and former manufacturers of the product as well as to any manufacturer of the item, with "general" priorities assistance, who has been producing it below his normal minimum rate because of military orders for other products and the military orders have been canceled or reduced.

3. Increased assistance may be granted if a manufacturer needs it in order to meet military requirements for his product that he did not contemplate at the time he filed application for third quarter assistance.

STEEL PRODUCT SUMMARY: *Figures below are from the American Iron & Steel Institute* 1944 *Annual Statistical Report soon to be released.*

(Net tons)

Product	1944	1943	1942	1941	1940
Pig Iron:					
Basic	45,886,008	45,374,662	43,532,865	39,759,841	33,987,734
Bessemer	9,756,836	10,258,788	9,865,220	9,522,343	7,386,320
Low phosphorus	474,686	538,832	562,672	474,428	448,956
Foundry	2,190,681	2,059,501	2,546,530	2,760,827	2,292,175
Malleable	2,494,659	2,393,241	2,399,520	2,417,137	1,832,401
Forge or mill	.....	.....	.....	1,074	3,590
All other	204,569	185,646	169,137	164,901	120,490
Total	61,007,439	60,810,670	59,075,944	55,100,551	46,071,666
Ferro-Alloys:					
Ferro-manganese and spiegel	809,638	803,623	785,103	730,009	746,896
Ferro-silicon	837,944	923,450	880,843	729,716	498,832
All other	211,177	232,204	161,414	126,328	81,135
Total	1,858,759	1,959,277	1,827,360	1,586,053	1,326,863
Total Pig Iron & Ferro-Alloys	62,866,198	62,769,947	60,903,304	56,686,604	47,398,529
Steel (ingots & steel for castings):					
Open hearth—basic	79,168,294	77,207,870	75,183,065	73,312,851	60,882,840
" " —acid	1,195,659	1,413,934	1,318,892	1,076,768	690,243
Bessemer	5,039,923	5,625,492	5,553,424	5,578,071	3,708,573
Electric	4,237,699	4,589,070	3,974,540	2,869,256	1,700,006
Crucible	25	146	2,010	2,313	1,024
Total Steel	89,641,600	88,836,512	86,031,931	82,839,259	66,982,686
Finished Hot Rolled Products:					
Plates—universal	1,676,100	1,603,247	1,825,372	1,265,964	762,644
" —sheared	11,447,323	11,515,693	9,974,228	4,933,611	3,560,764
Sheets—hot rolled	10,339,080	9,403,002	9,199,273	13,602,685	11,705,956
Strip	2,593,107	2,125,221	1,901,153	2,540,074	2,077,744
Strip and sheets for cold reduced black plate and tin plate	4,177,865	2,982,379	3,281,860	4,328,111	3,103,627
Hoops	68,596	60,884	93,071	108,722	97,074
Cotton ties and baling bands	35,892	46,212	54,895	44,461	44,918
Black plate	556	21,098	238,199	490,811	521,924
Total	30,338,519	27,757,736	26,568,051	27,314,439	21,874,651
Bars—merchant	10,532,250	11,383,501	10,110,222	9,143,455	6,459,263
" —concrete reinforcement	628,944	474,546	1,829,760	1,835,243	1,425,998
Total	11,161,194	11,858,047	11,939,982	10,978,698	7,885,261
Structural shapes—heavy	3,824,106	3,349,377	4,944,670	4,670,782	3,355,658
" " —light	852,375	1,226,467	871,651	1,053,454	876,688
Sheet piling	128,879	36,970	152,688	209,183	186,125
Rails	2,490,656	2,126,996	2,096,159	1,927,851	1,678,986
Splice bars and tie plate bars	862,383	583,798	745,150	742,382	515,928
Skelp	3,049,682	3,022,398	2,900,741	3,637,574	2,709,000
Blanks or pierced billets	3,677,631	3,470,797	3,039,174	2,945,921	2,320,966
Wire rods	4,646,298	4,693,798	4,632,017	5,268,423	4,351,848
Rolled forging billets	3,762,575	3,796,931	2,881,687	1,769,816	919,826
Blooms, billets, etc., for export	468,088	825,966	1,194,636	1,158,519	1,677,905
Car wheels (rolled steel)	291,529	233,915	234,794	269,911	191,102
All other	250,064	309,477	244,514	377,234	116,425
Total Hot Rolled Products	65,803,979	63,292,673	62,445,914	62,324,187	48,660,369

Cancels Z-1 and Z-2 Allotments on July 1

Washington

• • • **All allotments** of materials for the third and subsequent quarters that are identified by the Controlled Materials Plan allotment symbols Z-1 and Z-2, have been canceled, effective July 1, the War Production Board announced recently.

All preference ratings assigned to production schedules for the third and subsequent quarters that are identified by those symbols applied to or extended to orders calling for delivery after July 1, 1945, also have been canceled, WPB said. The order was contained in Direction 73 to CMP Regulation No. 1.

Consumers who have received authorized production schedules identified by the symbols Z-1 and Z-2 must, before July 1, 1945, cancel any use they have made of these allotments for the delivery of A products or controlled materials in the third and subsequent quarters, and any use of the preference rating for the delivery of other products or materials. Suppliers are also directed to disregard ratings and allotments so identified, WPB said.

Direction 3 to Order M-21-b-1 has been revoked and steel producers and warehouses must, effective July 2, treat all ZW orders as unrated orders.

Says WPB Will Set Up Units to Further Aid Industrial Research

Washington

• • • **The establishment** of laboratories, pilot plants and experimental shops designed to stimulate technological advances in a large number of industrial fields is one of the important reconversion aims of WPB, Chairman J. A. Krug has announced. Applications for assistance to build such experimental facilities will be granted whenever possible, within the framework of existing materials control, the WPB Chairman said.

He added that WPB is vitally interested in anything that would further industry, particularly small business, which, not having its own laboratories, stands to gain from highly publicized technological developments. Some steps have already been taken in this direction and more are under consideration.

"Because of the demands of a two-front war, little has been done in the past five years to build up our national quota of laboratories, pilot plants and experimental shops," Chairman Krug said. "They are the seeds from which an improved industrial economy for the future must grow. On them are based our hopes for a complete return to national vigor and full employment.

"At present the country's efforts in this direction depend on a comparatively small group of technologists and it is WPB's desire to help them as much as possible, consistent with the direct war needs in the Pacific."

Users of Canned Products Must Adopt Tin Can Salvage

Washington

• • • **The increasing scarcity** of tin has necessitated the broadening of scrap salvage measures to include all industrial tin can users, through an amendment to Order M-325, WPB has announced.

The amendment requires all manufacturers who use the contents of tin cans in their manufacturing operations to adopt tin can salvage measures.

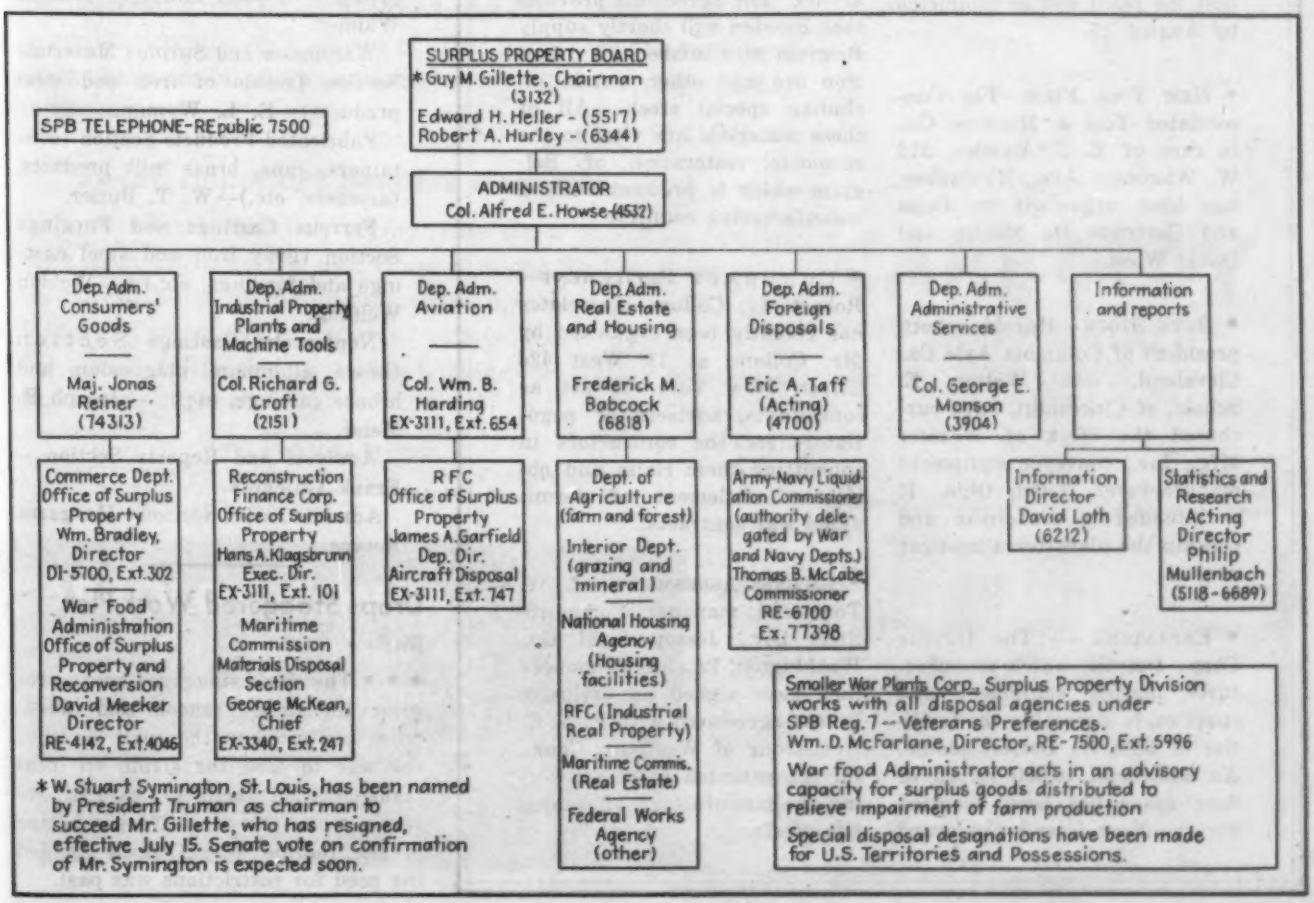
Deliveries in Third Quarter Seen Small On Unrated Business

Washington

• • • **The General Steel** Warehouse and the Sheet Steel Warehouse Industry Advisory Committees at recent meetings told WPB officials that declining inventories, together with inability to replace unrated orders on a rated basis after July 1, will limit warehouse deliveries on an unrated basis during the third quarter. Members of both committees reported that they had suffered inventory losses during the last six months through failure to obtain replacements promptly from producing mills. It was pointed out that warehouses would be forced to limit their unrated deliveries of each product to the tonnage received from suppliers on unrated orders.

Because WPB has issued allotments for the third quarter sufficient to absorb most of the steel produced, Committee members said, that warehouse deliveries on unrated orders during that period probably will be small.

SPB PERSONNEL: *The chart shows the latest setup of the Surplus Property Board. W. S. Symington takes office as chairman on July 15 replacing G. M. Gillette. The telephone exchange numbers for the various personnel are indicated on the chart, which are subject to change.*


SURPLUS PROPERTY BOARD
*Guy M. Gillette, Chairman (3132)
Edward H. Heller - (5517)
Robert A. Hurley - (6344)
SPB TELEPHONE-REpublic 7500
ADMINISTRATOR
Col. Alfred E. Howse (4532)
Dep. Adm. Consumers' Goods
Maj. Jonas Reiner (74313)
Dep. Adm. Industrial Property Plants and Machine Tools
Col. Richard G. Croft (2151)
Dep. Adm. Aviation
Col. Wm. B. Harding EX-3111, Ext. 654
Dep. Adm. Real Estate and Housing
Frederick M. Babcock (6818)
Dep. Adm. Foreign Disposals
Eric A. Taff (Acting) (4700)
Dep. Adm. Administrative Services
Col. George E. Manson (3904)
Information and reports
Commerce Dept. Office of Surplus Property
Wm. Bradley, Director
DI-5100, Ext. 302
War Food Administration Office of Surplus Property and Reconversion
David Meeker Director
RE-4142, Ext. 4046
Reconstruction Finance Corp. Office of Surplus Property
Hans A. Klagsbrunn Exec. Dir.
EX-3111, Ext. 101
Maritime Commission Materials Disposal Section
George McKean, Chief
EX-3340, Ext. 247
RFC Office of Surplus Property
James A. Garfield Dep. Dir. Aircraft Disposal
EX-3111, Ext. 747
Dept. of Agriculture (farm and forest)
Interior Dept. (grazing and mineral)
National Housing Agency (Housing facilities)
RFC (Industrial Real Property)
Maritime Commis. (Real Estate)
Federal Works Agency (other)
Army-Navy Liquidation Commissioner (authority delegated by War and Navy Depts.)
Thomas B. McCabe, Commissioner
RE-6700 Ex. 77398
Information Director
David Loth (6212)
Statistics and Research Acting Director
Philip Mullenbach (5118-6689)
Smaller War Plants Corp., Surplus Property Division works with all disposal agencies under SPB Reg. 7 -- Veterans Preferences.
Wm. D. McFarlane, Director, RE-7500, Ext. 5996
War Food Administrator acts in an advisory capacity for surplus goods distributed to relieve impairment of farm production
Special disposal designations have been made for U.S. Territories and Possessions.
*W. Stuart Symington, St. Louis, has been named by President Truman as chairman to succeed Mr. Gillette, who has resigned, effective July 15. Senate vote on confirmation of Mr. Symington is expected soon.

Industrial Briefs . . .

• ELECTS DIRECTORS—Lyall C. Stilp, Kimberly-Clark Corp., has been elected 1945-46 president of the Milwaukee Assn. of Purchasing Agents. Other officers elected are Edward L. Block, Unit Drop Forge Div., Fuller Mfg. Co., vice-president; Fred Syburg, Chain Belt Co., secretary; Clifford H. Dawley, Ampco Metal, Inc., treasurer; Ray W. Brick, Carnation Co., national director; and E. L. Janke, Joseph T. Ryerson & Sons, J. M. Hamilton, Dumore Co., Howell W. Pritchard, Kearney & Trecker Co., and N. A. Schowalter, West Bend Aluminum Co., local directors.

• AWARDS CONTRACT — The Linde Air Products Co., a unit of Union Carbide & Carbon Corp., has announced the award of a contract to Robert E. McKee, Inc., of El Paso, Tex., for the construction of a distributing plant in Odessa, Tex., to supply that area with Linde oxygen. Construction will begin immediately and it is expected that the plant will be completed by August 15.

• NEW TOOL FIRM—The Consolidated Tool & Machine Co., in care of E. J. Mueller, 212 W. Wisconsin Ave., Milwaukee, has been organized by Dean and Gertrude De Moulin and David Wood.

• BUYS STOCK—Harold Schott, president of Columbia Axle Co., Cleveland, and Walter E. Schott, of Cincinnati, have purchased the stock of Webster Mfg., Inc., conveyor equipment manufacturer, Tiffin, Ohio. It is intended to modernize and reequip the plant for a postwar project.

• EXPANDING — The Udylite Corp., Detroit, which manufactures plating equipment and supplies, is increasing the facilities of both its Detroit plants. An additional 16,000 sq. ft. of floor space has been acquired for the East Grand Boulevard plant and 15,000 sq. ft. of floor space is being added to the East McNichols Road plant.

• ACQUIRES COMPANY — Ekco Products Co., manufacturer of household cutlery, kitchen tools and tinware, has acquired Massillon Aluminum Co., Massillon, Ohio. The Massillon plant will manufacture a pressure cooker soon to be introduced, as well as its usual line of aluminum household cooking utensils.

• BUYS PLANT—H. F. Wardwell, president of the Detroit Steel Products Co., Buffalo, has announced the purchase of a plant located at 1210-20 E. Ferry St., for postwar production of prefabricated metal building materials. Estimated cost is $500,000.

• BELGIUM—Belgium and Sweden concluded an economic agreement whereby both governments open reciprocal credits, totaling 100 million Swedish kroner. The agreement provides that Sweden will shortly supply Belgium with lumber, pit props, iron ore and other metals including special steels. All of these materials are vital to the economic restoration of Belgium which is predominantly a manufacturing country.

• CONTRACT SETTLEMENT—Robert L. Collum Associates has recently been organized by Mr. Collum, at 11 West 42d Street, New York, to act as consultants, advisers or negotiators for the contractors in submitting their claim and obtaining settlement of terminated war contracts.

• LICENSE AGREEMENT — L. W. Townsend, manager, Composite Steel Div., Jessop Steel Co., Washington, Pa., has announced they have signed an exclusive license agreement with P. A. E. Armstrong of Westport, Conn., for his patented process covering the manufacture of composite steels.

Merges Iron and Steel And Nonferrous Price Section in One Branch

Washington

• • • Designed to center pricing activities for all metals into a single branch for closer coordination during the industrial reconversion period, OPA has merged its iron and steel and nonferrous price sections into the Metals Branch.

Heading the new branch is Warren M. Huff, who was price executive of the Iron and Steel Unit. Wylie McKinnon, who was acting price executive of the Nonferrous Metals Section, was named associate executive of the new metals branch. Addison T. Cutler was named as branch economist.

There are 10 sections in the new Metals Branch. These sections and their chiefs, are as follows:

Primary and Secondary Nonferrous Metals Section (refined nonferrous metals, such as copper, lead, zinc, etc., their alloys and scrap)—Kurt J. Rahlson.

Basic Materials Section (coke, pig iron, iron ore, etc.) — Dexter Tutein.

Iron and Steel Scrap Section — Cornelius D. Scully, Jr.

Steel Mill Products Section (all products of steel mills) — Russell Widmer.

Warehouse and Surplus Materials Section (resale of iron and steel products)—E. L. Wyman.

Fabricated Products Section (containers, cans, brass mill products, fasteners, etc.)—W. T. Butler.

Ferrous Castings and Forgings Section (gray iron and steel castings and forgings, etc.) — Weldon Welfling.

Nonferrous Castings Section (brass, aluminum, magnesium and bronze castings, etc.) — Joseph B. Meier.

Analysis and Reports Section — Frank Gutchess.

Administrative Section—Margaret Reeves.

Drops Staggered Work Plan

Buffalo

• • • The city's staggered-hours program for stores, schools and industries, instituted in the early days of the war to ease the strain on local transportation facilities, expired recently when the executive committee of the Buffalo War Council decided the need for restrictions was past.

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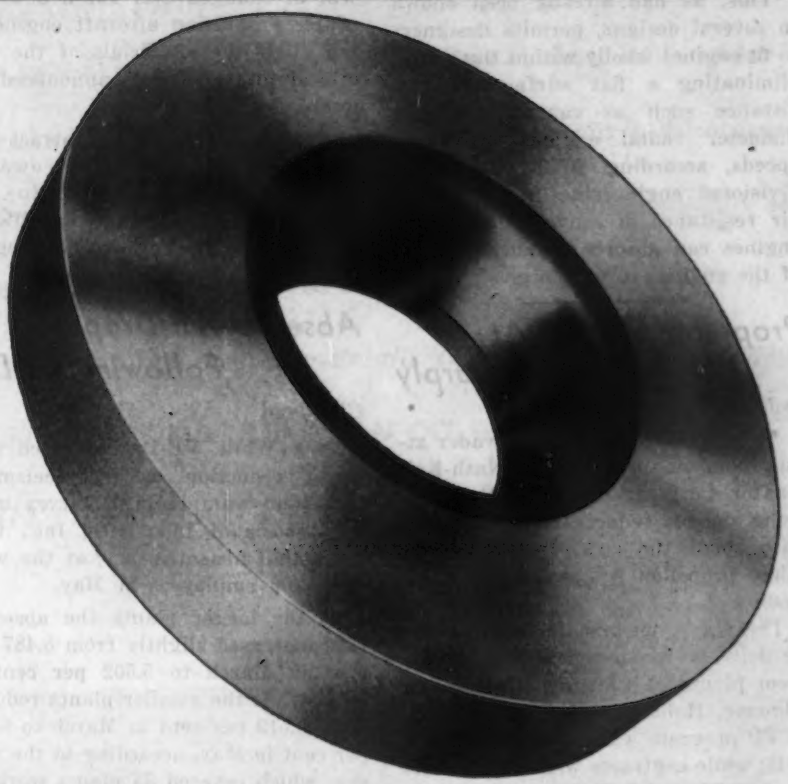

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- Closer Limits ❷
- More Continuous Operation ❸
- Fewer Rejects ❹
- Lower Cost ❺
- Better Finish ❻
- Increased Production ❼

Almost universally used for drawing cartridge cases, and steadily growing in application on a wide variety of other parts, carbide sheet metal dies today have established an amazing record of low cost, high quality performance.

Seven Important Benefits Now Obtained

Well known users consistently report these seven important benefits resulting from Carboloy Die use: Unusually long die life, closer tolerances on drawn parts, more continuous press operation, fewer "rejects", lower cost per piece, vastly improved surface finish—almost "mirror-like" in quality (often this means less buffing time)—and a substantial increase in output per press.

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Westinghouse Jets Promised Outsiders

Pittsburgh

• • • **Military jet propulsion** engines ranging from a midget the size of a heavy artillery shell to a keg-sized version producing as much power as the largest piston type aircraft engine were demonstrated on test stands recently to eastern aircraft manufacturers at the Westinghouse Electric Corp.'s Aviation Gas Turbine Division, South Philadelphia. Under authority of the Navy, for which Westinghouse developed the first wholly American design of jet propulsion engine, the plant builders had a private engineering preview of the units.

It was indicated that as soon as military demand permits, a part of the company's manufacturing facilities will be turned to the production of commercial versions of the present jet engines. These designs, however, will have propellers driven by compact, lightweight gas turbines somewhat similar to those that now produce jet thrust for higher performance military aircraft. Engineering work on these designs, based on present military engines, is already underway.

All versions of the gas turbine engines that were demonstrated utilize the "axial flow" or straight line principle of design. The air compressor that supplies the necessary oxygen for the 1000 mile an hour jet stream is built on a common shaft with the turbine that powers it, permitting small engine diameters for power output.

This, as had already been shown in several designs, permits designers to fit engines wholly within the wings, eliminating a flat surface air resistance such as caused by large diameter radial engines. At high speeds, according to R. P. Kroon, divisional engineering manager, the air resistance of conventional piston engines can absorb as much as half of the engine's total power.

Propeller Output At Nash Reduced Sharply

Detroit

• • • **Propellers for A-26** invader attack bombers produced by Nash-Kelvinator Corp. at Lansing, Mich., are being sharply reduced and will terminate about the end of August, but other propeller production will continue.

The Navy, meanwhile, has reduced its delivery requirements for LCVP's from plants of Chris Craft Corp. at Algonac, Holland and Cadillac. The LCVP program will continue well into 1946, while contracts with Chris Craft for LCPR's and LCP(L)'s will run out in late summer.

HOT FORMING MAGNESIUM—*A hydraulic press equipped with the new heat-resistant rubber forming pad developed by the U. S. Rubber Co., turns out magnesium aircraft parts which must be formed hot.*

Converting Plant To Jet Test Work

Buffalo

• • • **Testing cells** at the Chevrolet Aviation Engine Plant in Tonawanda will be changed over for a new type of jet propulsion aircraft engine being made there, officials of the General Motors subsidiary announced this week.

The company said a contract "not to exceed $500,000" has been awarded to the John W. Cowper Co., Inc., for conversion of the test-cell facilities in the Defense Plant Corp. buildings.

Absenteeism Drops Following VE-Day

Cleveland

• • • **While VE-Day** resulted in a slight reduction in absenteeism in Cleveland war plants, a survey made by Associated Industries, Inc., indicated that absenteeism cost the work of 16,300 employees in May.

In the larger plants the absentee rate increased slightly from 5.487 per cent in March to 5.502 per cent in May, while the smaller plants reduced from 5.519 per cent in March to 5.120 per cent in May, according to the survey, which covered 35 plants working 10,000 man days or more for the month, and 126 working less than 10,000 man days. In these plants, 66,640 employees were scheduled to work 1,755,681 man days and lost 95,289 days through unaccounted absences.

Figures of the plants reporting male and female workers separately indicate that the female employees helped keep the average steady. The over-all percentage of absenteeism in these plants was 5.24 in May, a reduction from 5.35 in March. Male employees, however, were absent 4.72 per cent of their scheduled working days, an increase over March when the figure was 4.44 per cent. In these plants, female workers reduced their March percentage of 7.64 to 6.60.

All employees covered by the survey were scheduled to work an average of 26.3 days in the month. The 95,289 man days lost, therefore, represent the work of 3623 employees for the full month. Extended to cover the estimated 300,000 people working in Cleveland industry, the survey would indicate that absenteeism cost the work of 16,300 employees in the Cleveland area in May.

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Association Publishes List of 800 War And Industrial Standards

New York

• • • A new list of all American standards and war standards approved to date has just been published by the American Standards Assn. and is available free of charge.

There are approximately 800 standards listed in the booklet, covering specifications for materials, methods of tests, dimensions, definitions of technical terms, procedures, etc., in the electrical, mechanical, building, transportation, textile and other fields.

There is also a separate list of war standards, jobs carried through since Pearl Harbor at the specific request of Army, Navy or industrial groups. Since the war, the ASA has been working very closely with government agencies and with the armed services to provide specifications for certain of the materials necessary to our war effort. Because these standards are developed through an accelerated procedure, they are designated as American war standards. To date, there are 117 completed war standards and many more under development. These standards have been established in the field of safety work, machine tools, quality control, photography, radio and others. All are designed to relieve shortages of time, materials, or manpower.

One important phase of the work built up during these years is in the field of safety engineering. The new list includes 137 safety standards.

In each case the standards represent general agreement on the part of maker, seller, and user groups as to the best current industrial practice. More than 600 organizations are taking part in this work.

Krug Meets Steel Executives

New York

• • • J. A. Krug, Jr., chairman, and several members of the War Production Board held recently at La Guardia Field the first of a series of industrial conferences with representatives of leading steel companies. The conference was held in a stop-over as the party was en route to Milwaukee for conferences there with industrialists, representatives of labor and small business men.

Representing the steel companies in the party were Charles White, president of the Republic Steel Company; Eugene G. Grace, president of the Bethlehem Steel Corporation; Frank Perry, president of the Carnegie Illinois Steel Company, and J. L. Purnell, president of the Youngstown Sheet and Tube Company.

Real Weekly Earnings Decline During March, Says Conference Board

New York

• • • Real weekly earnings of production and related workers in the 25 manufacturing industries surveyed each month by the National Industrial Conference Board dropped 2.1 pct from March. However, the April index of 178.0 (1923 = 100) indicates that the average production worker's weekly income could purchase 2.7 pct more than it could a year ago and 66.0 pct more than in 1929.

Real weekly earnings are dollar earnings adjusted for changes in living costs and indicate the workers' actual purchasing power.

Key figures in The Conference Board's survey include the following:

Hourly earnings in April remained unchanged at the March level of $1.101. They have risen 4.2 pct in the past year and 86.6 pct since 1929.

Weekly earnings declined 1.7 pct in April. At $50.11, they were 4.2 pct higher than in April, 1944 and 75.5 pct greater than in 1929.

Hours worked per week were 0.7 hour, or 1.5 pct less than in April. The work week of 45.4 hours was 0.2 hour, or 0.4 pct, longer than in April of last year, but 2.9 hours, or 6.0 pct, shorter than the 1929 average.

Employment in the twenty-five industries showed a decline of 1.6 pct during the month, and of 9.6 pct since April, 1944. Since 1929, however, the payrolls of these industries were expanded by 32.7 pct.

Man hours were reduced 3.1 pct in April and were 9.2 pct less than the average of a year earlier.

To Halt 8-in. Shell Output

Buffalo

• • • Production of 8-in. high explosive shells for the Army will be halted at the Buffalo plant of the American Car & Foundry Co. on July 31, according to the Rochester Ordnance District. This contract termination follows a cutback in the plant's output of 8-in. and 240-mm. shells ordered by the Army a month ago.

Although the latest curtailment will mean the laying off of about 125 workers, the plant will continue to produce other shells, including the 240-mm. size for the Army and heavy shells for the Navy.

RUSSIAN ROLLING STOCK: *Three car building shops in Canada are devoting their efforts exclusively to the production of rolling stock for Russia. The finishing touches, including lettering, are applied in the shop.*

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You outline requirements and he offers suggestions.

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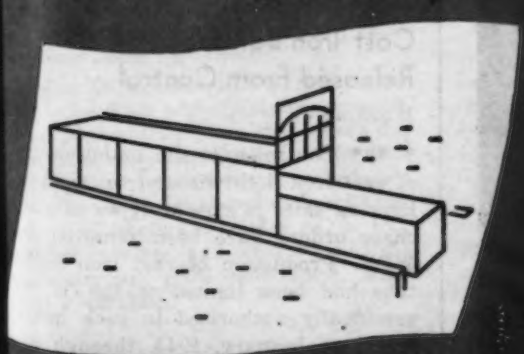

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Bill Raises Exemption Of Tax Under Excess Profits to $25,000

Washington

• • • **Moving to provide** adequate funds for industry during the reconversion period the House Ways and Means Committee has approved legislation raising the exemption under the excess profits tax from $10,000 to $25,000, beginning with the tax year 1946.

Other major provisions of the bill:

1. Provide that the postwar credit of 10 per cent of the excess profits tax be taken currently with respect to tax liabilities of 1944 and subsequent years.

2. Advance to Jan. 1, 1946, the maturity date of outstanding excess profits tax postwar refund bonds.

3. Speed-up refunds resulting from carry backs of net operating losses and of unused profits credits.

4. Speed-up refunds resulting from the recomputation of deductions for amortization of emergency facilities.

The bill also allows treatment of reorganized railroads similar to that of old railroads in the carry back provisions. Corporations working on a fiscal year instead of calendar year would get credit for the increased excess profits exemption for the part of their fiscal year falling within the calendar year 1946 under the new legislation. The bill now goes to the Committee of the Whole of the House.

Cast Iron Bathtubs Released From Control

Washington

• • • **Control over** the manufacture of cast iron bathtubs and restrictions limiting sales to specific types of purchase orders have been removed by WPB. Production of cast iron bathtubs had been limited to the 50,000 specifically authorized in each quarter since January, 1944, through directions to the plumbing and heating simplification order, L-42.

These production and distribution controls have been removed by revocation of Direction 6 to L-42. However, the manufacture and distribution of cast iron bathtubs remain subject to all other applicable WPB orders and regulations.

Miss Throckmorton Puts a V. P. Wise to MUREX FHP

This time, things are what my boss calls "quote, the same—only different, unquote."

The part that's the same is that they're stumped again out in the factory, and that here is this urgent memo yelling for help from my boss, the Vice President in Charge of Production.

The part that's different is that this time the trouble is in our new arc-welding department, and for once my boss does not know the answer.

"Miss Throckmorton," he tells me, in this half-joking way, "you used to work in an arc-welding company. What's the best 'hot rod' for horizontal and flat fillet welding, deep groove work, cover beads and other downhand applications? They want it to operate on either AC or DC, at high currents, and with a rapid deposit rate and good penetration. What shall I tell them?"

"Tell them," I suggested, "to try MUREX FHP. My last boss always called it the best 'hot rod' made. He said it was the old original rod of its type and still way out in front as first choice of most of the big fabricators."

My boss looked at me sort of pop-eyed, then tossed me the memo.

"Here," he grinned, "you tell them."

Three days later we get this enthusiastic report from the arc-welding department. They'd just tried MUREX FHP and ordered a thousand pounds of it. "*Best hot rod on the market,*" the report wound up. "*Weld metal is X-ray sound and ductilities excellent. Little spatter produced, even at high currents, and slag removes freely. Concave fillets and layers in deep groove work are produced without undercutting. In case you can spare Miss Throckmorton, we can use her.*"

That one the boss answered himself, on the phone, with a grin. "Miss Throckmorton will stick where she is," he told them, winking at me proudly. "And if you want to stick where *you* are, you'd better stick to MUREX."

P.S. Miss Throckmorton again. Besides FHP, MUREX makes about 30 electrodes for mild steel, low-alloy steel, stainless steel, and hard surfacing. They're conveniently classified and described on a big MUREX Wall Chart, of which you should have a copy. Just address:

METAL & THERMIT CORPORATION

120 BROADWAY, NEW YORK 5, N. Y.

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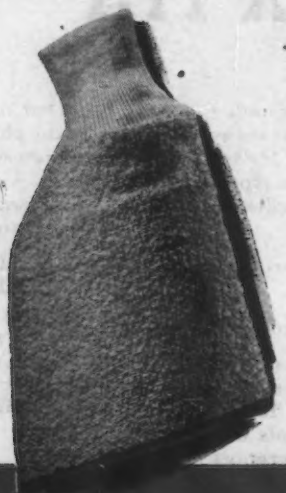
The Gauntlet Lives on, and on!

Users of gauntlet-style industrial gloves can now prepare for some *big savings:* Jomac offers its new Safety GAUNTLET-CUFFS . . . and licks an ages-old problem of waste! The *Gauntlet-Cuff* is a separate piece, an extra-strong covering for the worker's forearm. The worker merely adds new gloves to the Safety *Gauntlet-Cuffs* and once again has a gauntlet-type glove. Jomac Safety *Gauntlet-Cuffs* and Jomac *Gloves* . . . an unbeatable *economy team!*



JOMAC *Safety Gauntlet-Cuffs*

By the makers of the famous JOMAC *Industrial Gloves*

SEE THEM WORK! Test these new Jomac Safety *Gauntlet-Cuffs* in your own plant. Check them for their easy workability, their economy. Write for details. C. WALKER JONES CO., Philadelphia 38, Penna.

Three Types of Jomac Gloves

REGULAR INDUSTRIAL TYPE — HEAT- AND FLAME-RESISTING — SAFETY GAUNTLET-CUFFS

War Plant Lease To Budd Co. Will Provide For Peacetime Output

Washington

• • • **The Reconstruction** Finance Corp. has leased the government-owned Bustleton (Philadelphia) plant now operated by the Edward G. Budd Mfg. Co., under an RFC war plant facilities lease sponsored by the Navy Dept. to the Budd Co., in what is the largest war plant lease to be negotiated to date for the purpose of providing space for peacetime production. The transaction has been approved by the Surplus Property Board.

The total manufacturing area of the plant is more than a million sq. ft. The terms of the new lease, which runs for five years, provide that 77 pct of the space will ultimately be used by Budd in manufacturing lightweight stainless steel railway passenger cars. A substantial portion of this space is presently used in the manufacture of munitions. The company has also indicated that it may want to utilize the remaining 23 pct once production gets fully underway on its non-war contracts. This space is presently used as a disposal center for surplus property, according to RFC.

Throughout the negotiations, the government's reconversion policy of keeping employment at the highest level possible during the reconversion period was set as a principal objective. The company reported to RFC that, as space is released from war work, the plant's operation will be converted as rapidly as possible to peacetime production.

Truman Pledges Action On Premiums at War End

Washington

• • • **President Truman** upon signing the law extending to June 30, 1946, the RFC Premium Price Plan for copper, lead and zinc, served notice that he would request enactment of legislation to permit a reduction of the subsidies if it became clear that the continuance of payments at present levels were no longer required for war purposes.

Federal Loan Administrator John W. Snyder said that subsidy payments under the plan have exceeded $200 million.

LS-2

Any chef will tell you he can mix and boil, and stir and season, but he can't get the best from his recipe unless he combines his experience and skill and knowledge with the ingredients he so carefully chooses. And it's that way in our own business, too! We season your specifications with our own long helpful experience, we mix common sense with an understanding of your problem, we make use of the basic ingredients of willingness and "know-how" to produce a better job faster! Indeed, there isn't any shortage of *service* on the daily Levinson menu!

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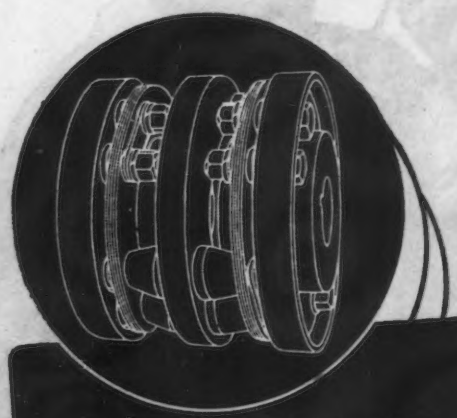
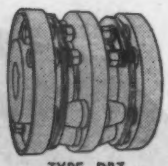
....are specified by engineers, wherever 100% Operating Efficiency is demanded





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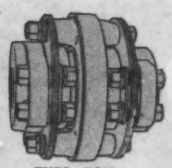

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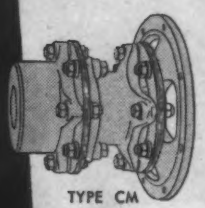

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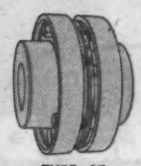

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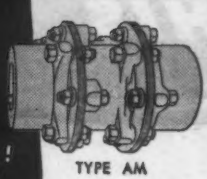

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THOMAS *Flexible* COUPLINGS provide for Angular and Parallel Misalignment as well as Free End Float... *and Eliminate* BACKLASH, FRICTION, WEAR and CROSS-PULL

NO LUBRICATION IS REQUIRED!

The Thomas All-Metal Coupling does not depend on springs, gears, rubber or grids to drive. All power is transmitted by direct pull.

WRITE FOR COMPLETE ENGINEERING CATALOG

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WARREN, PENNSYLVANIA

WPB Acts to Speed Production of Some Civilian Products

Washington

• • • **With the important provision that industries can get the necessary material and manpower, neither of which is assured, WPB's action on June 28, in either revoking or subjecting to the spot authorization procedure of all orders restricting production of hard goods, is expected to step up output of some lines of civilian goods. The WPB made its move by amending PR-25 ("spot authorization" order). The significant civilian products added to the "spot authorization" procedure are passenger cars, trucks and radios. Care was taken, however, to point out that these products will receive no priorities assistance. These are included in the list of nine L orders in Direction 1 to PR-25 amended. The inclusion of L-265 (Electronic Equipment), it was specifically stated by WPB, is not expected to result in production of radio broadcast receivers for civilians for several months since military electronic requirements are so heavy that components will not be available for some time for civilian demands.**

The amended Direction 1 to PR-25 states that until one of the following orders has been specifically amended to provide otherwise, authorizations granted under PR-25 will give relief from those provisions of the order which either prohibit manufacture entirely or restrict the amount of manufacture permitted. (The authorization will not, however, in any way relieve the person receiving it from any other restrictions of the order.)

Orders listed in Direction 1 are:

L-1-e — Motor Truck and Truck Trailers; L-2-g—Passenger Automobiles; L-5-c — Domestic Mechanical Refrigerators; L-13-b—Use of Metal in Furniture and Fixtures; L-23-b—Domestic Electric Ranges; L-23-c—Domestic Cooking Appliances and Domestic Heating Stoves; L-257-c—Farm Machinery; L-260-a—Furniture and Furniture Parts; L-265—Electronic Equipment.

In addition, PR-25 provides that "spot authorizations" may be made under any other order that is amended to provide for such authorizations. This includes the following additional orders at the present time:

L-270 — Automotive Maintenance

It is reported that . . . . . .

One of the obstacles in the way of large-size home television is the cost of the necessary aspherical lenses. A new material and method makes it now possible to mold these accurately of plastic at much lower cost. *Polaroid Corp.*

get ready with **CONE** for tomorrow

A "plastic foam" has been developed that is semi-rigid and weighs only about one-seventh as much as cork.—*U. S. Rubber Co.*

get ready with **CONE** for tomorrow

A western college is preparing courses in the management of small business, particularly for returned veterans. *Western Reserve University.*

get ready with **CONE** for tomorrow

Before the war we imported about one million glass eyes from Germany. Now an American manufacturer is reported to be filling a Russian order for 50,000 plastic eyes and to promise them for the use of our civilians later in the year. *American Optical Co.*

get ready with **CONE** for tomorrow

Three coal companies and six railroads are to collaborate in a million dollar research program to improve the coal burning locomotive. *Bituminous Coal Research, Inc.*

get ready with **CONE** for tomorrow

An automobile manufacturer is expected to enter the farm market with a number of new tools including a modified flame thrower for killing weeds. *Graham-Paige Corp.*

get ready with **CONE** for tomorrow

A new electronic piston ring inspection instrument uses beams of light to check accuracy within 0.001 inches in less than five seconds. *Sheffield Corp., Dayton.*

get ready with **CONE** for tomorrow

A new process claims to be able to electroplate aluminum with any of the conventional plating metals. *Alumon Euthone Co., New Haven.*

A new glass resists heat up to 1650 degrees Fahrenheit. *Vycor—Corning Glass Works.*

get ready with **CONE** for tomorrow

A new Diesel engine burns natural gas, coke-oven gas or sewage gas, as well as oil, without shutting down to exchange parts. *Cooper-Bessemer Corp.*

get ready with **CONE** for tomorrow

A new anodizing process makes magnesium resistant to corrosion. *Consolidated Vultee.*

get ready with **CONE** for tomorrow

The craft of gem cutting is being taught in this country to returned veterans in an effort to hold the advantage in this field that the war has given us. *Gabriel Williams, N. Y.*

A 96-pound bearing produced by powder metallurgy is claimed to be the largest of its type yet made. *Chrysler Corp., Amplex Div.*

get ready with **CONE** for tomorrow

The first direct drive steam turbine locomotive to be built in the United States is undergoing tests to determine its adaptability to long-distance high-speed freight and passenger service. It is said to be capable of pulling a passenger train at 100 miles per hour. *Penn. RR Baldwin Locomotive Works—Westinghouse.*

get ready with **CONE** for tomorrow

A photographic technique is claimed to be so sensitive that it will record even differences in air pressure such as shock and sound waves or air jets. *Schlieren Method—General Electric.*

get ready with **CONE** for tomorrow

A new dynamometer can stop a 158 ton wheel, whirling 3 miles per minute in 18 seconds. *Westinghouse.*

RUST

is picking your pocket!

Every speck of rust on your equipment and material costs you money—needlessly! You can STOP destructive corrosion by simply spraying, dipping, brushing, or flushing metal surfaces with Tectyl—it *seals* out moisture for as long as two years. Tectyl leaves a thin, transparent film; you can always see the protected metal. A little Tectyl covers a lot of surface and comes off quick and clean with kerosene.

THERE IS A TECTYL PRODUCT FOR EVERY RUST PROBLEM

Specification Number	Title	Tectyl Product
AXS-673	Compound, Rust Preventive (Lead Base)	*Tectyl 481*
2-122	Oil, Lubricating Preservative, Medium	*Tectyl 421*
AXS-934	Oil, Engine Preservative, Grade 1-SAE 10	*Tectyl 1097*
AN-C-52a Type 1 alternate	Compound, Exterior Surface Corrosion Preventive	*Tectyl 481*
52-C-18	Compound, Rust Preventive, Thin-Film (polar type)	
	GRADE I	*Tectyl 506*
	GRADE II	*Tectyl 502*
	GRADE III	*Tectyl 511*

—AND MANY OTHER SPECIALIZED TYPES. Write today, tell us your corrosion problem, and we'll send you a Tectyl bulletin with complete application data.

TECTYL *STOPS RUST*

VALVOLINE OIL COMPANY

431 Main Street, Dept. 25G, Cincinnati 2, Ohio

Refinery at Butler, Pennsylvania — General Offices, Cincinnati, Ohio

New York-Atlanta-Pittsburgh-Chicago-Detroit-Los Angeles-Vancouver, B. C.-Washington, D. C

Equipment; L-71—Dry Cell Batteries; L-98—Domestic Sewing Machines; L-65-a—Electric Irons; L-176—Electric Fans.

WPB officials indicated that production restrictions may be removed from other orders in addition to these five.

WPB also issued Direction 4 to PR-25, canceling all third-quarter and subsequent quarterly allotments identified by the CMP allotment symbol "Z-1," and all preference ratings of AA-5 assigned to production schedules authorized under PR-25 for the third and subsequent quarters.

Applications for spot authorization should be made at the WPB field office nearest the applicant's plant by filing form WPB-4000. The field office will provide for clearance with the Production Urgency Committee on all applications involving more than 100 persons in Group I and II labor areas. Authorizations will be granted if manpower, materials and components are available for the proposed production.

Direction 4 states that persons who have placed rated orders and made allotments pursuant to previous PR-25 authorizations are required to cancel the ratings and the allotments on orders for delivery after July 1, when CMP was completely "open-ended" for the delivery of unrated orders. Suppliers must disregard ratings and allotments identified by the CMP allotment symbol Z-1 on orders calling for delivery after July 1. Formerly the symbol of a deferred order, "Z-1" will become unrated.

Simultaneously, WPB amended Direction 5 to PR-1, Direction 20 to CMP Regulation 2 and Direction 1 to PR-13 to provide that these directions expire June 30, unless sooner revoked or modified.

Centers on Birmingham Plant

Birmingham

• • • **Rheem Mfg. Co.** will look to its Birmingham plant for a considerable portion of its production in the Southeast, it was announced here recently following a two-day meeting of managers of plants from that territory. Not less than $500,000 will be expended for new equipment for the Birmingham plant, it was announced after the conference. Rheem is actively engaged in mapping its postwar plans and is ready for immediate reconversion in several instances, the company said.

WHEN RECONVERSION TO CIVILIAN PRODUCTS makes LOW-COST an important production factor . . . use dependable

OAKITE CLEANING

Materials . . . Methods . . . Service

Surface preparation of metal parts before final finishes are applied is a PRODUCTION OPERATION importantly influencing product COST. Dependable, fast, economical Oakite cleaning helps you keep this operation at or below specified limits.

36 Years' Experience

Long experience serving thousands of plants manufacturing practically every civilian type product, implemented by successful experience in finding the right answers to complex production-cleaning problems on a wide range of war supplies, provides the sound basis and reasons that prompt so many leading concerns to select and rely on the Oakite organization for authoritative technical help and the materials and methods that keep production volume up and costs down.

You are invited to apply this valuable experience to your work, particularly when changing over from war to civilian supplies.

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Available to meet the high standards of today's stream-lined production, whether for degreasing, machining, grinding, stamping, drawing, burnishing, descaling, rust removal or other related operations, are over 70 different Oakite materials specifically designed to assure speed, thoroughness and production economy on the work to which they are applied. Uniformity and high quality of Oakite materials is maintained and assured through constant factory batch-inspection by Oakite chemical engineers. Each Oakite material is guaranteed to perform as specified or it costs you nothing.

Nationwide Service

Oakite's field staff of technically trained men with their intimate knowledge of metal surface preparation requirements and the operations associated with them are always at your service, as also our chemical and mechanical research laboratories, without cost or obligation. This personal help and advisory service is yours for the asking on any reconversion production-cleaning problem.

Stocks of various Oakite materials are warehoused at strategically located transportation points that make possible delivery of materials when they are needed.

TELL US YOUR PROBLEM: The operations of cleaning and surface preparation figure so largely in production cost that Oakite offers all its comprehensive facilities and "know-how" to keep them on an economical basis. Whatever your product or cleaning problem, write us today. All inquiries promptly answered.

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HACK SAW BLADES with EASY-STARTING TEETH

D istributes wear full length of blade
U seful in starting cut at any angle
P revents slipping off cutting line
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Saw Specialists Exclusively for Over 65 Years
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National Tube Speeds Up Tap Carbon Tests By Novel Procedure

Pittsburgh

• • • **Tap carbon analysis** has been speeded up at National Tube Co.'s National works by a novel sampling procedure now in standard use at several U. S. Steel Corp. subsidiary plants according to the company.

The procedure consists of taking a test spoonful of slag-free metal from the bath, killing the steel with aluminum wire and drawing a column of approximately 6 in. of clean steel up into a 6 mm pyrex glass tube by means of a 1 oz. rubber bulb.

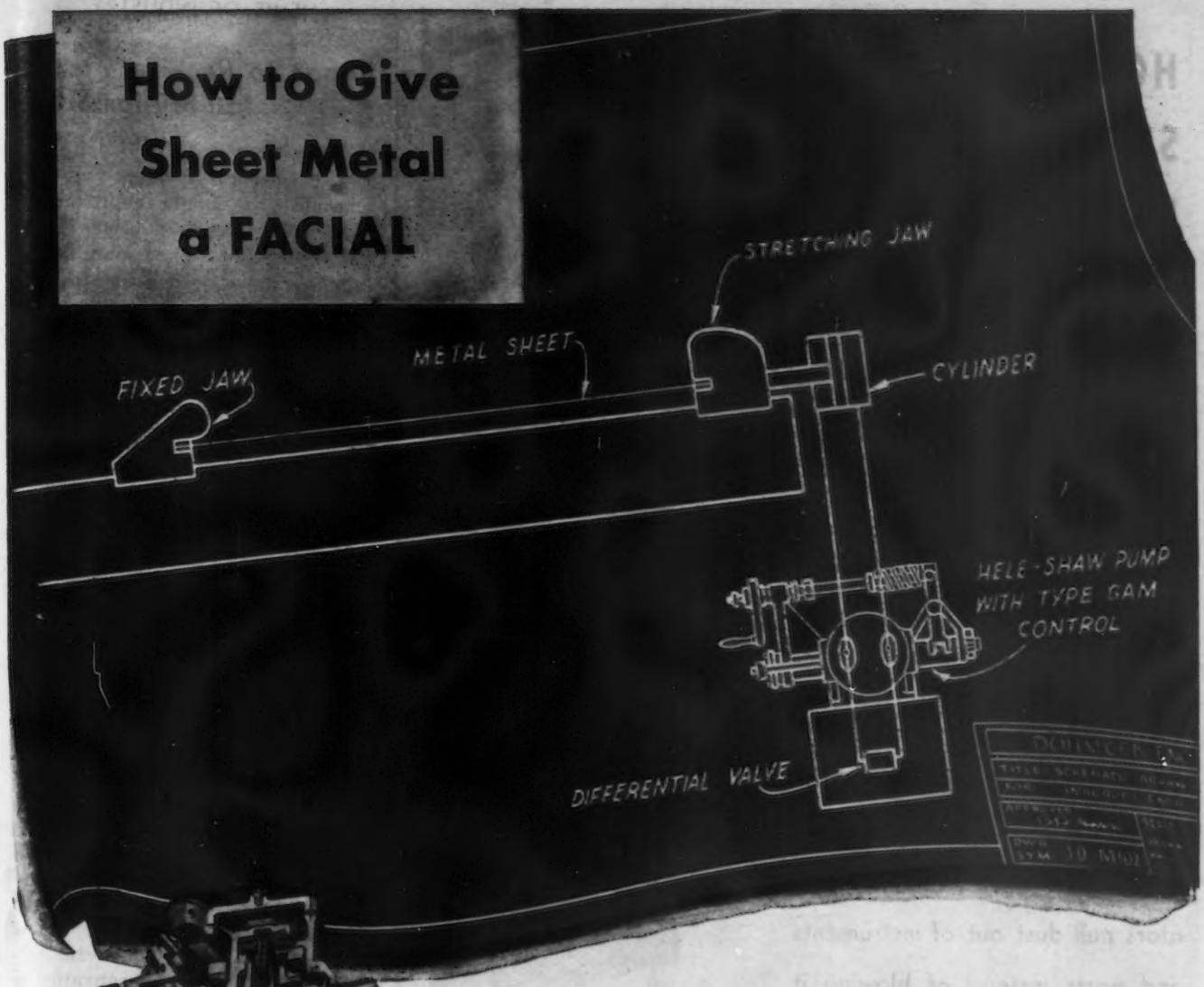
CARBON CONTENT: *Sampling a heat of steel with pyrex tube and rubber bulb at U. S. Steel plants.*

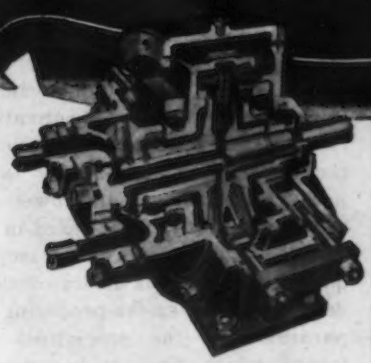
Caution must be exercised to assure that no slag covers the surface from which the sample is drawn and that no time is lost between withdrawing the spoon from the bath and taking the glass tube sample. The sample is quenched in water, the glass broken from the steel and ¾-in. long test piece sheared from the center of the rod by wire clippers.

This test piece is weighed directly and fused under standard conditions in a high temperature combustion furnace for carbon determination. The entire process requires approximately 12 min.

The test piece is said to be ideal for carbon analysis since it is free from scale, segregation and pipe. Experience with the new test, the company says, shows a substantial saving in furnace time after a heat has been "blocked" and an improvement in the control of ladle carbon analysis. Patent applications have been filed covering the new test and procedure.

How to Give Sheet Metal a FACIAL





THE HELE-SHAW

Fluid Power

PUMP

OTHER Æ PRODUCTS:
Æ-TAYLOR AND PERFECT SPREAD STOKERS,
MARINE DECK AUXILIARIES, LO-HED HOISTS
DIAMOND FACE GRINDERS

A "SKIN-SMOOTHING" TREATMENT ACCOMPLISHED WITH HELE-SHAW FLUID POWER

Unsightly wrinkles and flabbiness are a heap easier to remove from sheet metal than from the "skin you love to touch". A metal sheet need only be inserted between the jaws of a sheet stretcher. After a shot of Fluid Power from a Hele-Shaw Pump has been applied, the sheet comes out flat and smooth as a mill pond.

A Hele-Shaw regulator automatically decreases the stretching speed as the pull increases, a situation ideal for sheet stretching.

Walloping pressures and the ease of applying and regulating them are a few of the many good reasons for using Fluid Power. Think *hydraulic* next time and remember Hele-Shaw Fluid Power.

AMERICAN ENGINEERING COMPANY

Subsidiaries: COCHRANE CORPORATION, PHILADELPHIA, PA., FARADAY ELECTRIC CORPORATION, ADRIAN, MICH.
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BENCH CLEANING

Any production man with imagination can apply Spencer Vacuum to improve or increase production, in a new way.

RECLAIMING BABBITT

Four examples are shown on this page. Air is removed from paper bags before sealing. Bench operators pull dust out of instruments and parts instead of blowing it all over the plant. An engine manufacturer recovers babbitt on the production line, and enamel dust is removed from stencils.

CLEANING ENAMEL STENCILS

1½ H.P. PORTABLE

The same Spencer Vacuum machine, portable or stationary, cleans floors, walls, ceilings and machinery better, faster and at less cost. Bulletins on request.

276-C

SPENCER VACUUM CLEANING

THE SPENCER TURBINE COMPANY, HARTFORD 6, CONN.

Japan to Receive 150 Million Bombs

Washington

• • • **Chemical Warfare** Service is scheduled to supply approximately 150,000,000 incendiary bombs during the ensuing 12 months for use against Japanese industrial centers, the War Department has announced. This means that CWS, which furnished nearly 160,000 tons of fire bombs for all theaters in the last six months, will double that production in the next six months and almost triple it for the first half of 1946.

In tonnage, the number of CWS incendiary bombs booked for Japan next year amounts to nearly 850,000 tons. This is about 80 per cent of the tonnage of all kinds of air bombs (high explosive included) used by the Army Air Forces in all theaters last year.

Success of Chemical Mortar Battalions in all theaters has resulted in a demand for more of these supporting units, as well as an increase in the number of white phosphorous and high explosive shells now fired by the famous 4.2 in. rifled chemical mortars (goon guns) in amphibious as well as land operations. Present production of shells for this mortar is 25 per cent over that of a corresponding period of last year. New mortar battalions are scheduled for activation as rapidly as possible. Portable and tank-mounted flamethrowers and a new "hose-line" flamethrower—used to root out Japs from holed-in positions—will be produced in increased quantities. There is also a continuing demand for smoke-producing apparatus and the specialized CWS troops which used it in protecting troop movements.

Alabama's Coal Output Down

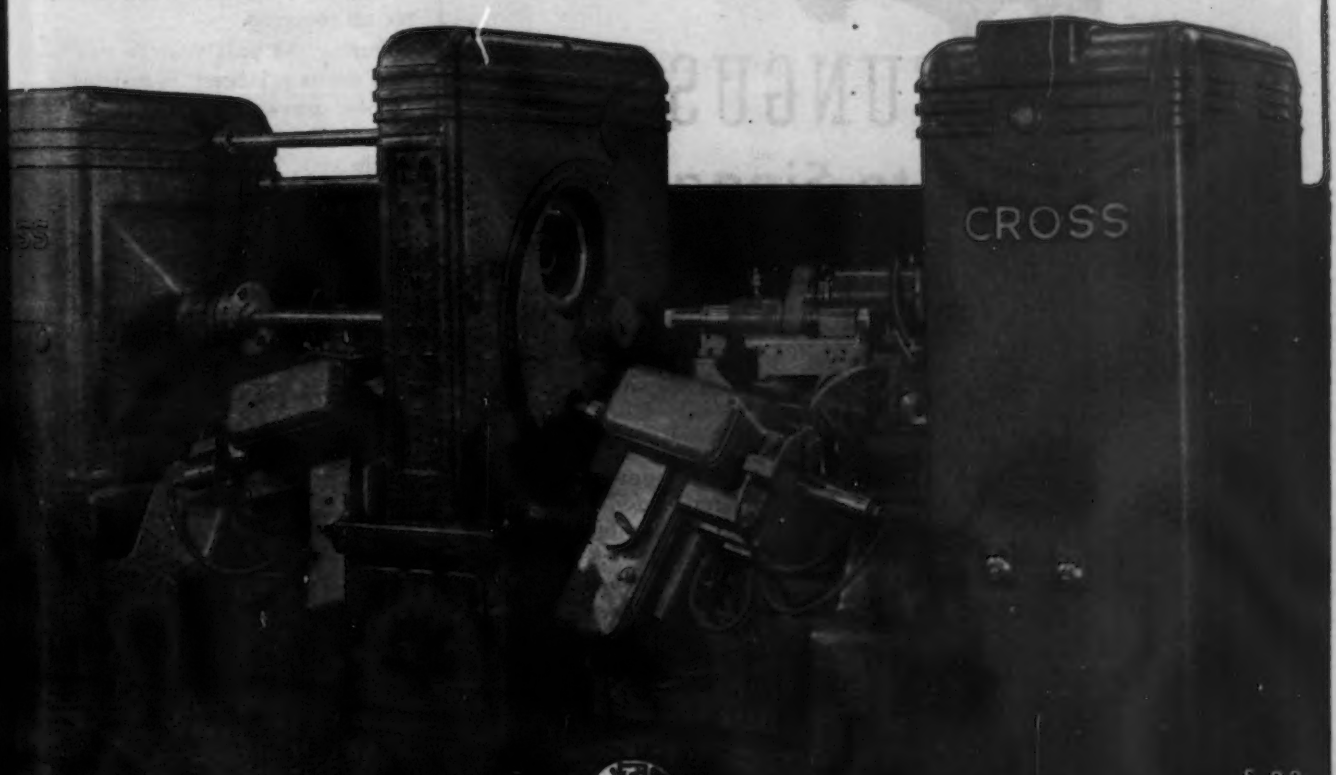
Birmingham

• • • **Alabama produced** 7,444,000 tons of coal in the first five months of this year as compared to 8,329,000 for the same period last year, it was reported by the State Dept. of Industrial Relations. Production of coal in the state has shown a weekly increase since consummation of the new agreement, the War Manpower Commission reports, and considerable of the success is attributed to a manpower drive under sponsorship of WMC and the United States Employment Services which is seeking to fill a 2000-man gap in employment.

4 THE MACHINE

A 4-spindle Cross Special Machine with a 3-station trunnion type fixture first indexed the work-piece between two opposed grinding heads and next between two opposed honing heads. All four heads operate simultaneously to grind and hone both bearings at opposite ends of the hubs. The trunnion then indexes to a third station for unloading and reloading the hubs. Production is at the rate of 50 hubs an hour, automatically machines to an accuracy of 3-micro inch surface finish.

Cross Special Machines have proved their economy in operation and are a means whereby a substantial profit will be possible in the highly competitive postwar market. May we help you prepare for it? Write The Cross Co., Detroit 7, Mich., Dept. 152.



5-22

SPECIAL MACHINES

for automatically performing any one or a combination of metal cutting operations
TURNING · MILLING · DRILLING · BORING · REAMING · TAPPING · GRINDING

FREE of FUNGUS....

from Seattle to Singapore because of FIBREEN

A few years ago, a certain exporter faced the situation of leather hides arriving in China seriously damaged from fungus.

Various methods of protection were tried — until one day he hit upon FIBREEN. This important industrial paper not only prevented fungus from developing in transit — but also created other typical FIBREEN savings. Crating was eliminated, cargo space lessened, weight cut down, freight charges lowered, and claims reduced.

And in spite of exposure to rain, heat, salt air, humidity, and rough handling, FIBREEN was resold and used for protecting other materials stored on the China Coast.

Hundreds of manufacturers are finding in FIBREEN the answer to many of their shipping problems. It is enabling them to save time, material, freight, and handling charges, as well as give their products unmatched protection. Why not investigate its possibilities in your business.

Sisal fibre reenforcement for strength—special asphalt for water-proofness—kraft paper to make it scuff-proof—sealed by heat and under pressure to produce Fibreen.

Manufacturers of SISALKRAFT, FIBREEN, SISAL-X, SISALTAPE AND COPPER-ARMORED SISALKRAFT

Canadian Industries Planning Conversion To Postwar Activity

Toronto

• • • **Canadian industrial leaders** are giving close attention to plans for an early changeover from war to civilian manufacturing activities and according to announcements from government and company sources the new setup will be on a much larger scale than it was previous to the outbreak of the war. Since the end of 1939 approximately $1.5 billion has been spent on new plant construction and equipment. Practically all this expenditure was for war purposes, but most of the buildings and equipment will be converted to peacetime operations.

Already about a dozen war plants have been sold to companies that will carry on manufacturing activities, and other government-owned plants will be sold. Still others may be divided and leased to small manufacturing concerns.

During the past year or two many of Canada's largest industries have adopted a new policy. Instead of centering plants and equipment in a single city, town or area, they are now starting to spread out and are preparing to establish smaller units throughout the Dominion. Already there are evidences of such a policy being adopted by several of the largest industries; Canadian General Electric, Massey-Harris and others have either started construction of new plants in small towns or have announced plans for new building projects in new localities well separated from present headquarters.

Despite the fact that the signal has been given by government officials for a number of industries to resume peacetime production, there are still a number of handicaps to be overcome before widespread output of consumer goods can get underway. The automotive industry has been authorized to turn out 10,000 passenger cars this year, according to C. D. Howe, Minister of Munitions and Supply; increased production of electric stoves, washing machines, vacuum cleaners and various other household appliances has been approved in government circles; restrictions on manufacture of agricultural implements have been withdrawn; and steel and various other metals now are open for pur-

These Small Chicago Wheels MAKE INDUSTRY HUM!

CHICAGO GRINDING WHEELS AND MOUNTED WHEELS

Millions of whirling abrasive wheels, trained in war's tough school of precision finishing, each doing a prime job in laboratory, tool room, aboard ship, on production line. And — they're all set and eager to tackle civilian goods when peace machinery is singing again.

Whether it's removing burrs, smoothing edges, squaring surfaces so accurately that the finish can be measured in micro inches, or cut-off work—there's a Chicago ready to do a top-ranking job for you.

VITRIFIED GRINDING WHEELS with a 50-year pedigree. Up to 3" in diameter in various abrasives and bonds including the famous FV Bond.

MOUNTED WHEELS. The largest assortment made with a shape and abrasive to take care of every internal and external finishing job.

CUT-OFF WHEELS. All types and sizes. Now offered with the sensational new special-formula RT Bond (rubber or resinoid).

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SEND FOR TEST WHEEL

Learn first-hand about Chicago's superiority. Tell us what you have to finish, size wheel you'd like and we'll mail one promptly.

★ Half a century of specialization has established our reputation as the Small Wheel People of the Industry.

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PUSH BUTTON CONTROL!

Another "PLUS" Feature of KINNEAR Motor Operated Rolling Doors

KINNEAR push button operation assures added savings in manpower, heating and air conditioning costs, and in time. With a touch of the finger on the Control Switch, KINNEAR Motor Operated Rolling Doors can be opened and closed or stopped and reversed at any point in their travel.

OPERATE KINNEAR DOORS FROM MANY POINTS

KINNEAR Motor Operated Rolling Doors can be instantly and completely controlled from various convenient points, such as guard houses, checking stations, the Traffic Manager's desk or other locations. Also any number of doors can be controlled from a single point. Other features of KINNEAR Motor Operated Rolling Doors include — Rugged, flexible steel slat curtain that coils upward out of the way . . . Helical spring counterbalance . . . Kinnear "tough" all-steel construction that stands up under hard usage . . . Full use of wall, floor and ceiling space around the door . . . Many others. Write today for complete information! The KINNEAR Mfg. Co., Factories: 1760-80 Fields Ave., Columbus 16, Ohio; 1742 Yosemite Ave., San Francisco 24, Calif.

Offices and Agents in Principal Cities.

SAVING WAYS IN DOORWAYS

KINNEAR ROLLING DOORS

chase for other articles of civilian use.

To undertake large scale production of these goods, however, it will be necessary to do considerable retooling, raw materials will have to be accumulated and necessary labor obtained. All these factors now are bottlenecks, especially labor and raw materials, and it is not expected that much improvement in production of the more essential civilian goods will develop until the end of this year or early 1946.

Canadian industry is building up a very large backlog of orders for products of a peacetime nature, for domestic use and export. While a minor lull in production between war and peace output is almost certain to develop, and in some instances already is in evidence, industrial leaders look for record production activities over the next three or four years while making replacements of goods that have been off the market since early in the war. Export demand for Canadian products shows indications of large expansion and already big orders have been received from Russia, India, South America, France and Belgium, as well as most of the British Dominions. The experience gained in the war years together with the big expansion in the Canadian field of manufacture are expected to place this country in a position to compete with other world nations in export markets for articles that formerly were not turned out in the Dominion.

Canadian industry is looking forward to a new era of prosperity that will take in the manufacture of finished goods and the development of her vast mineral wealth and other natural resources on a scale far beyond anything previously accomplished.

Tungsten Order Revoked

Washington

• • • **Army cutbacks** in high speed tool steel requirements have permitted the revocation of the tungsten order, M-21-j, WPB announced on July 2.

The tungsten order required that all users of high speed tool steel divide their purchases on the basis of not more than 15 pct of Class B tool steels with a 12 pct tungsten content and 85 pct with a tungsten content of 6.75 pct. The present supply of tungsten is adequate to warrant the elimination of the purchase requirements at this time, WPB said.

WHEN YOU APPLY A LAMSON LOCK NUT TO A BOLTED ASSEMBLY.. AND IT WILL HOLD TIGHT RIGHT WHERE YOU LEFT IT

● When you apply a Lamson Lock Nut you spin the nut on the bolt thread as freely as a Class 3 fit permits, until the bolt thread engages the thread in the *locking crown collar.* Then you'll need a wrench to seat the nut against the work—for it's the grip of the threads in the *locking crown collar* that locks it on the bolt.

Here's what happens. When the bolt is tightened by the nut, the "pressure flanks" of the working threads of the nut stress the bolt and force the collar back toward its original round form. As this occurs, the "non-pressure flanks" of the grip threads of the nut are engaged, and through them is applied the vertical pressure which locks the nut. There is no pitch interference since the thread has the same lead throughout.

Lamson Lock Nuts are tapped in the usual way, then the threaded portion of the *locking crown collar* is distorted from the round on opposite sides, causing it to grip the bolt thread like a vise. A resilient, permanent spring action is imparted by heat treatment to the *locking crown collar* of the nut. This truly is a *lock nut* —and *it is all metal!* Because it is all metal it can be used under any combination of these conditions—*Heat:* the Lamson Lock Nut is in use at elevated temperatures up to 800° Fahr. *Ice:* it is used in guns and motorized equipment in Alaska. *Steam:* all metal, it is unaffected by steam. *Oil and Water:* all metal, this nut is unaffected by either.

Re-use in the field is important when supplies are short and what is on hand must do the job. Re-use in domestic civilian applications is just as important to conserve supplies. In impartially supervised laboratory tests the Lamson Lock Nut held tightly after repeated applications, removal torque dropping less than 1 ft. lb. per cycle in 10 on-and-off cycles.

On applications where vibration and shock are severe, Lamson Lock Nuts are meeting specification requirements. They are made in standard sizes from #10-32 up to 2-inch diameters, and unless otherwise specified, are provided with a non-seizing, rust-resistant black finish. If you have applications where vibration shakes nuts loose—make your own tests with Lamson Lock Nuts. They may solve a problem for you. Ask for samples, or ask for a Lamson engineer to call and talk it over.

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Plants at Cleveland and Kent, Ohio; Chicago and Birmingham

"BOLTS, NUTS & SCREWS"—1944 REVISION. Cloth bound. Limited edition, 180 pages of technical, practical information. Sent prepaid for *$1.00—cash or check must accompany your order.*

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"SIMPLIFIED STOCK LIST"—Of bolts, nuts and screws, conforming to latest revisions of the Office of Price Administration, and of great value in showing you in what ratio quantities of various standard products are kept in stock for deliveries, by your jobbers and in our own (and other bolt manufacturers') warehouse stocks. *Sent gratis.*

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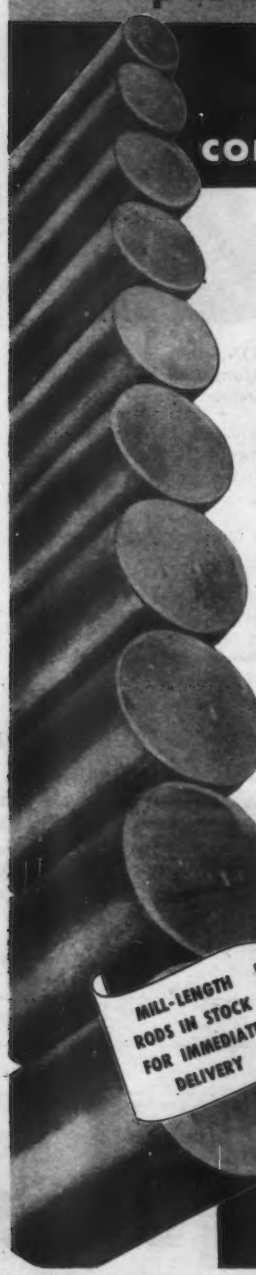
BOLTS · · NUTS · · COTTERS · · CAP SCREWS · · SPECIALS

Your Jobber Stocks the Lamson Line

Important Production Economies with Bearing Bronzes in This New Form

No costly scrap — certain yields — faster production on screw machines

with Ampcoloy continuous cast bronze rods



For the first time, certain bronze alloys — previously available only as sand, permanent mold, or centrifugal castings — are now produced in 10 foot lengths by a continuous casting process, exclusive with Ampco in the cast bronze field.

The comparative photomicrographs (tin bronze) illustrate the tremendous improvement in quality. Also the materials are adaptable to fabrication on automatic screw machines, with big savings in time, manpower, and money. Sand-free surface—no internal segregation—uniform diameter and even length. Scrap loss due to metal faults practically eliminated.

Also available are high-lead bronze and other bearing bronzes. Immediate shipment on rods up to 2" in diameter. Tubes available for prompt shipment, in tin bronze only.

Write for data sheet 131. *Ampco Metal, Inc., Dept. IA-7, Milwaukee 4, Wis. Ampco field offices in principal cities.*

Reg. U. S. Pat. Off.
AMPCO
A-16

Ampcoloys are a product of
Ampco Metal, Inc.
. . . specialists in engineering, production, finishing of copper-base alloy parts

Willow Run Builds Last B-24 Liberator

Detroit

• • • The last of the Ford-built B-24 Liberator bombers rolled off the assembly lines at the big Willow Run bomber plant recently.

It was bomber No. 8685 in the line of aerial battle wagons the Ford company began making in the factory late in 1942. Present as the assembly line closed down was Henry Ford II and the relatively few remaining plant workers.

The plant until a few months ago was turning out approximately 18 of the huge bombers a day. Its highest production month was March, 1944, when 462 planes were built.

The closing down of the assembly lines at Willow Run means also the end of the B-24 bomber production, for Willow Run had been the sole producer of the big four-engined bomber for many months.

Many of the bombers assembled at the plant and sent overseas are back on the Willow Run airfield, where they are being "pickled" and stored for possible future use.

Westinghouse Income To May Drops 11 Pct.

East Pittsburgh

• • • Although net sales of $326,258,529 billed by the Westinghouse Electric Corp. for the first five months of this year were practically equal to those of the same period last year, net income dropped from $8,631,690 to $7,689,043, a reduction of 11 per cent.

In making this announcement A. W. Robertson, chairman, stated that the reduction in income resulted from the lower prices received for war materials "following the fixed policy of the company to operate on a narrow margin in all war work although without a corresponding decrease in our manufacturing costs."

Mr. Robertson pointed out that the backlog of unfilled orders has been cut from $796,564,382 a year ago to $556,818,396 at the end of May, 1945. "This," he said, "is a reminder that war production load on business will one day disappear and then business and workers again will have to depend upon civilian needs for orders and jobs.

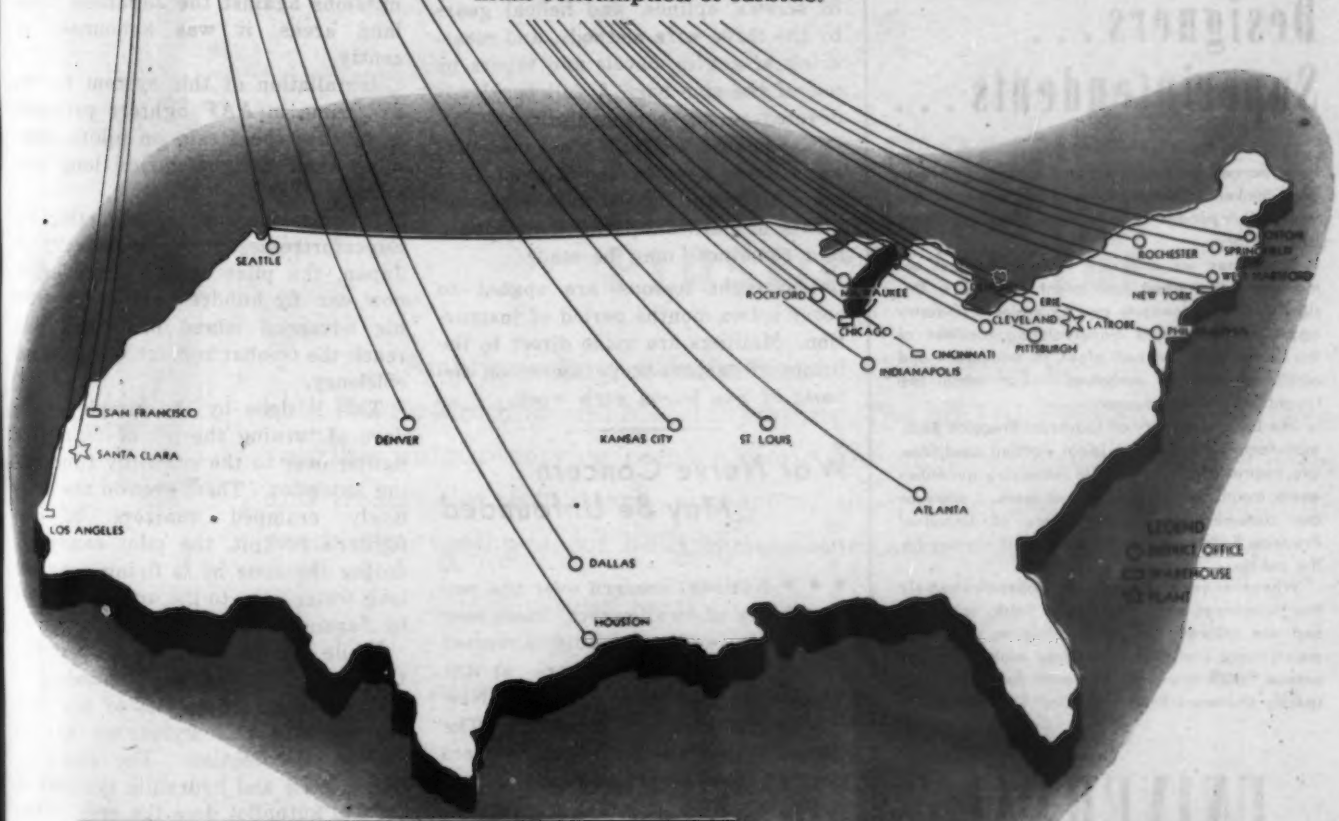
KENNAMETAL—THE ALL-AMERICAN CARBIDE

Serviced by a Nation-Wide Organization

The ingredient that distinguishes steel-cutting Kennametal from other cemented carbides (the unique intermetallic compound, $WTiC_2$) is an American invention, developed in 1937 by the president of Kennametal Inc. Using $WTiC_2$ as the key ingredient, he began making Kennametal tool blanks, of graded compositions suitable for different steel-cutting purposes, in a small plant employing twelve persons, at Latrobe, Pa.

Kennametal soon became established as the tool material that made possible machining of hard steel, accurately, at economy-promoting speeds. In eight years its use has spread, until today Kennametal Inc. has grown to such stature that it successfully serves hundreds of America's major metal-working plants.

Kennametal Field Engineers are more at home in these plants than in their own offices. Their on-the-spot "know-how" enables Kennametal users to obtain optimum production from a tool material that has demonstrated amazing inherent effectiveness. Call on them—they are at your service to help you get maximum output with minimum consumption of carbide.



HOW YOU'VE GAINED FROM KENNAMETAL'S GROWTH

Kennametal—constantly improved throughout the years—now costs its users less than one-tenth of what it did when introduced. This price reduction has been achieved wholly because of increased production and improved manufacturing technique—the very conditions that you can help to bring about in your metal-working plant, through proper utilization of Kennametal tools.

"The Thinker," first known as "The Poet," was intended to sit at the top gate of hell and contemplate the scene at his feet.

Engineers . . .
Designers . . .
Superintendents . . .

have earned an exalted place among America's best thinkers. Contemplating each move in advance, their productive genius has rolled up victory after victory.

These men we sincerely invite to inspect our modern independent ball plant. Engineers, Designers, Superintendents and Captains of industry appreciate the ideal manufacturing facilities of this newly designed ball plant, its equipment and above-the-average personnel—all of whom are taught to be skillful thinkers.

The uniform quality of Universal Precision Balls, manufactured under such ideal working conditions, are appreciated and used in increasing quantities every month by the most critical users. A copy of our customer list—regular users of Universal Precision Balls—will verify this fact. It is yours for the asking.

Whenever you need precision balls of extremely fine tolerances, perfect surface finish, sphericity and size accuracy that reduce friction, wear and maintenance costs to an absolute minimum, guaranteed 100% inspected and individually gauged, specify Universal Precision Balls.

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PRECISION BALLS
OF STEEL, BRONZE AND SPECIAL MATERIALS

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Established 1894 Telephone: Willow Grove 1200

Doall Announces Home Study Course

Minneapolis

• • • **Feeling that** wider knowledge of precision measurement will aid industry in cutting costs and increasing production, Continental Machines, Inc., Minneapolis 4, has prepared a correspondence course comprising a group of eight lessons for industrial and vocational gage training programs under the title, "Science of Measurement."

The lessons illustrate the care and use of gage blocks and many concrete examples are given along with photographs showing how their use may be expanded. Photographs show inspection methods utilizing height gages, locating gages, go-and-no-go gages, micrometers, lead screw measuring gages, scribers, dividers, and the new mobile inspection unit.

Tables and formulas simplify such problems as measuring pitch diameter of screws, splines, and helical gears by the three wire methods, and measuring of angles, bevels and tapers by use of the sine bar. A full booklet is devoted to the comparator.

The chapter on light wave measurement shows how, by use of monochromatic light and optical flats, measurements of flatness, parallelism, length and roundness may be made.

The eight lessons are spaced to cover a two months period of instruction. Mailings are made direct to the homes of inspection personnel on the basis of one lesson each week.

War Nerve Concern May Be Unfounded

Paterson, N. J.

• • • **National concern** over the employability of "war nerves" cases may be unduly exaggerated if a recent survey of nervous workers at the Wright Aeronautical Corp.'s New Jersey plants is any indication. The study established that such workers were as dependable and productive as employees without nervous ailments.

During a 10-month period, 455 applicants for employment were interviewed by the company psychiatrist because of extreme nervous conditions, the report said. Some of this group were described as severe cases of "war nerves." They were placed on jobs building Cyclone 18 engines for B-29 Superfortresses after receiving the same training accorded to normal workers. At the end of the 10-month period a check revealed that 250, or 54.9 pct were still employed, and 205 or 45.1 pct had moved into other fields of employment.

The records of 455 non-nervous employees hired during the same period for similar jobs were then studied. Two hundred and forty-five or 53.8 pct were still employed and 210 or 46.2 pct had shifted to other work.

Each employee's record of employment was thoroughly examined, the study delving into work habits, quantity and quality of work, absenteeism and accident rate. In all respects it was concluded, the so-called nervous group was as good as the average group.

AAF Fighters Now Carry Autopilot

Lynn, Mass.

• • • **Thunderbolt fighters** now are being equipped by the AAF with General Electric autopilots for combat missions against the Japanese homeland areas, it was announced recently.

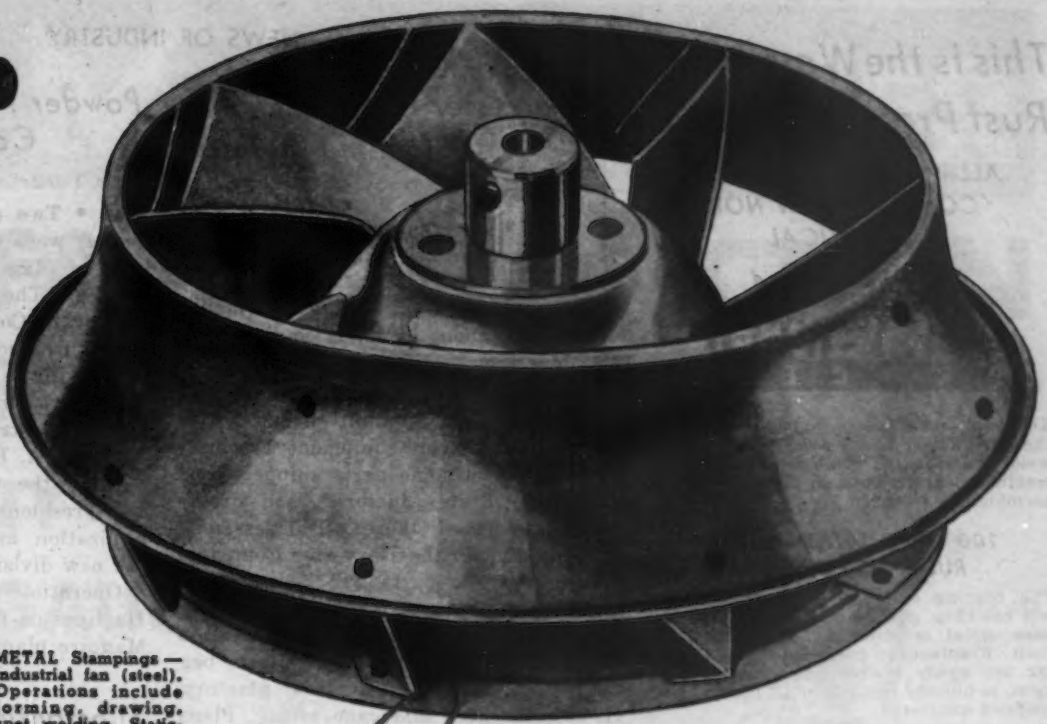
Installation of this system for the first time in AAF fighters primarily is to ease the strain on pilots, trimming their fatigue during long missions.

On missions such as escorting the Superfortresses in their attacks on Japan, the pilot of the Thunderbolt now can fly hundreds of miles from his advanced island base and still reach the combat zone at top physical efficiency.

This is done by the simple procedure of turning the job of flying the fighter over to the smoothly functioning autopilot. Then, even in the relatively cramped quarters of the fighter's cockpit, the pilot can relax during the time he is flying over the long water hops to the areas defended by Japanese fighters.

While the autopilot is in control, the lone pilot in the Thunderbolt makes occasional checks to see that his compass and gyroscope are in precise coordination. The combination electric and hydraulic systems of the GE autopilot does the rest of the job. The plane follows its set course with exactness.

The AAF pilot, by turning a valve and flicking a switch, can resume control of the plane. Then, after completing operations in the enemy defended zone, the pilot can chart his course back to his base; turn to autopilot flying and relax again. On reaching his base, he takes the controls and lands.



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America's largest Industries are benefiting by our experience in both Plastic Molding and Metal Stamping. The METAL SPECIALTY CO. offers you this unique service combination. Our alert experienced Engineering and Designing staff keeps abreast of the rapid changes in material and production methods, for both Metal Fabricating and Plastic Molding.

PLASTIC MOLDING DIVISION . . . All thermoplastics from a fraction of an ounce up through 18 ounces per shot.

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This Is the Way to Easy Rust Proof Fabrication

ALL-WELDED GALVANIZED CONSTRUCTION NOW PRACTICAL

by the patented

GALV-WELD PROCESS

The weld and adjacent damaged area where the galvanizing burns away at the time of welding are coated while welding, using the residual heat to flow on Galv-Weld Alloy, permanently insuring

100% PROTECTION AGAINST RUST AND CORROSION

The coating eliminates painting expense; will not chip, peel or crack, even when the base metal is stressed beyond its elastic limit. Fractures in galvanizing due to forming are easily coated. The alloy, in bar form, is quickly applied in all positions and confined quarters.

Galv-Welding obsoletes riveted, bolted, soldered constructions; lowers costs; makes for stronger, leak-proof, vibrationless construction. It produces no fumes, requires no sand or grit blasting, flux, special equipment, set-up or clean-up after application. Government approved, with tests showing Galv-Weld Alloy equal to and/or better than hot dip galvanizing in corrosion resistance, not only passing standard salt spray requirements of 200 hours, about eight days, but remaining in test 141 days. Galv-Welded joints have withstood over eight years' exposure to salt air mists without failure.

Galv-Weld Alloy is used on U. S. Navy, USMC, Coast Guard and Army Supply Vessels and on USN repair vessels in battle areas.

Very pleased with the result.
TAMPA SHIPBUILDING COMPANY

By using Galv-Weld in galvanizing plate and pipe welds, both in our shop and in place on the hulls, we are spared additional time and considerable expense involved when sending material out to be galvanized after welding.
TODD-PACIFIC SHIPYARDS, INC.

Our sheet metal shop uses Galv-Weld Alloy on all welded seams and flanges on ventilation ducts; our piping department finds it excellent for re-galvanizing pipe; and our rigging department utilizes Galv-Weld in their work with rigging fittings and pins.
KEWAUNEE SHIPBUILDING & ENGINEERING CORP.

Our workmen like Galv-Weld.
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Of invaluable assistance in dressing up metals after welding in places that are inaccessible to hot galvanizing processes.
BROWNSVILLE SHIPBUILDING CORP.

You may, without charge, submit samples for producing examples of Galv-Welding. Attach coupon to your firm's letterhead.

GALV-WELD PRODUCTS
324 East 2nd St., Dayton, Ohio

( ) Please send without obligation, information on Galv-Weld Process and sample of Galv-Weld Alloy.

( ) I am forwarding parts for free processing.

Name .....

Firm .....

City .....

Harvester to Build Plant in Monterrey

Chicago

• • • **International Harvester Co.** will commence construction within the next few months of a farm machinery plant at Saltillo, Coahuila, Mexico, about 55 miles southwest of Monterrey.

A modern structural steel factory building will be built primarily for use as a farm equipment assembly plant, with some parts shipped from United States factories and others manufactured there. Progressively, according to the Harvester Company, more of the parts will be manufactured in Mexico. Included among the equipment to be made in the Saltillo plant will be plows, discs and peg tooth harrows, cultivators, planters, corn shellers and cane mills. Plans call for completion of the structure, which will occupy about 100,000 sq. ft by July 1946.

Liquidation Posts Filled

Washington

• • • **James M. Brittain,** Haverford, Pa., and Phelps Kelley, Lake Forest, Ill., have joined the Office of the Army-Navy Liquidation Commission and have reported for duty with its European headquarters, Commissioner Thomas B. McCabe has announced. Mr. Brittain, general counsel of the Federal Reserve Bank of Philadelphia, and member of the law firm of McCoy, Brittain, Evans and Lewis of that city, will be director of the Contract and Claims Division, ANLC, European Theater of Operations. Mr. Kelley, a director of the Chicago Times, Inc., and vice president of the Miehle Printing Press & Mfg. Co., Chicago, will be chief of the Operations Division.

Sells Blast Furnace Property

Birmingham

• • • **Sale of its blast furnace properties** at Holt, Ala., to DeBardeleben Coal Corp., Birmingham, was made recently by the Tennessee Coal, Iron & Railroad Co. DeBardeleben officials said the blast furnace installations have been resold to Charles Temmerson & Sons, Tuscaloosa, for scrapping. Of the 51 acres of land, part was bought by Southern Products Corp. (chemical plant), which is working on a new site for removal of its plant from Tuscaloosa, proper.

Powder Metallurgy Companies Merged

New York

• • • **Two powder** metallurgy companies were merged into a new division of Maguire Industries, Inc., recently. The companies were the Ferrocart Corp. of America and the Micro Products Corp. The new division will be known as the Micro-Ferrocart Products Division of Maguire Industries.

Harry A. Ford, founder and president of the two firms, was made a vice-president of the Maguire organization and general manager of the new division.

Operations have been moved from Hastings-on-Hudson to one of the Maguire plants at Stamford, Conn.

Substantial Cutbacks Offset by New Orders

Buffalo

• • • **The Gould Coupler Works** of the Symington Gould Corp. at Depew has received substantial cutbacks in orders for armor castings for tanks, but orders for railroad castings have taken up the slack, according to officials of the company.

The Gould Works, which has been devoting about half of its facilities to armor castings, now is using only about 10 pct for that type of work.

Daniel P. Murphy, general manager, said that "for all practical purposes, we're just about reconverted to peacetime production." He added that current operations are about 75 to 80 pct of capacity, and that this rate could be easily increased if manpower were available.

Merger Plan Submitted

New York

• • • **Directors of the** Colorado Fuel & Iron Corp. recently submitted to the directors of Wickwire Spencer Steel Co. a plan for the merger of the two companies.

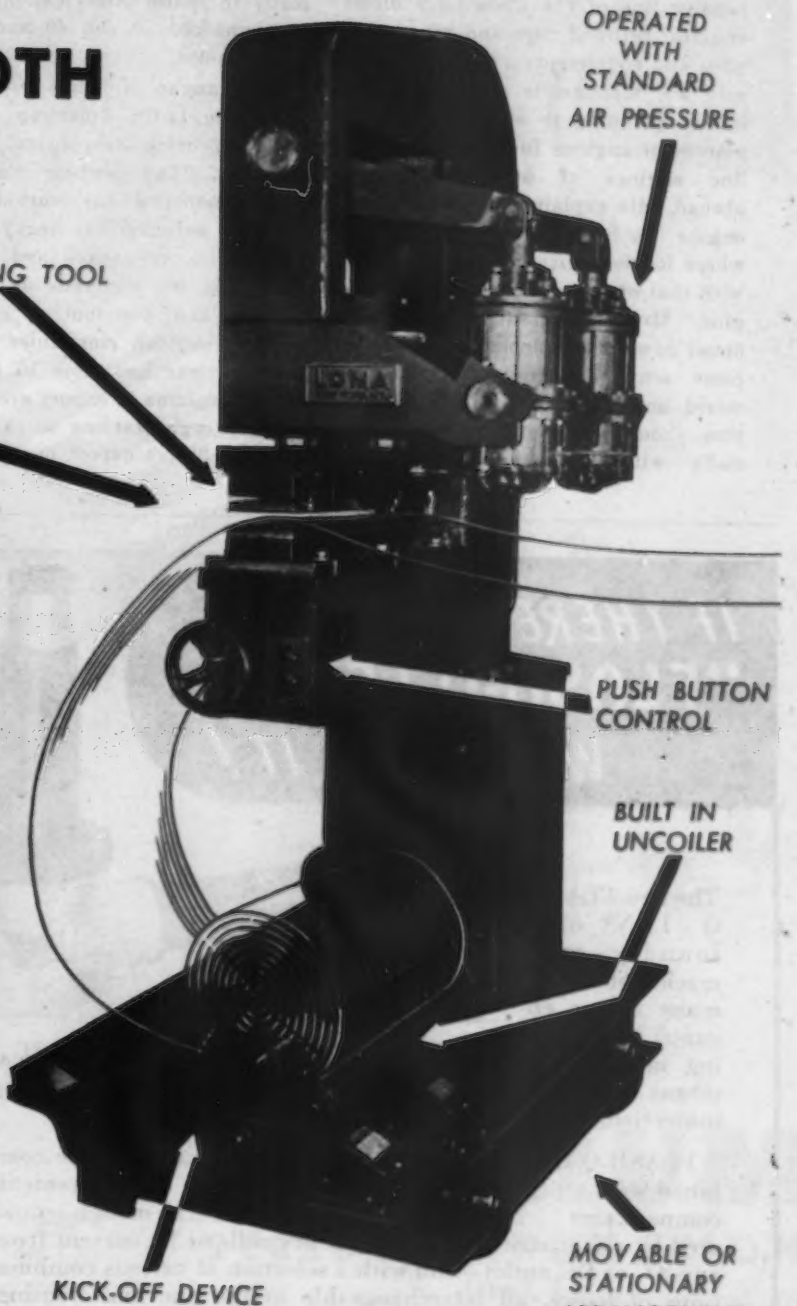
The plan calls for recapitalization of Colorado Fuel splitting the capital stock two for one.

Present holders of Colorado shares would be given two shares of the new common for each share held.

Colorado Fuel would consent to the payment by Wickwire Spencer of a dividend of $1 a share prior to consummation of the merger and in the meantime Colorado Fuel reserves the right to continue to pay quarterly dividends of 25 cents a share.

LOMA STITCHER

FOR FAST CONNECTION OF METAL STRIPS OF ANY WIDTH AND GAUGE



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ALL MACHINES BUILT TO PARTICULAR REQUIREMENTS OF CUSTOMER

LOMA MACHINE MANUFACTURING CO., INC.
580 FIFTH AVENUE, NEW YORK 19, N. Y.

Buda Co. Organizes For Latin-American Market

Harvey, Ill.

• • • **The Buda Co.** has reorganized the Companhia Buda do Brasil at Rio de Janeiro, establishing it as headquarters for all its South American trade, according to R. K. Mangan, executive vice president. This company will display and sell a comprehensive line of the Buda Co.'s diesel engines, railroad cars and other supplies and equipment. The Buda Co., said Mr. Mangan, is already supplying or planning to supply diesel replacement engines for standard gasoline engines of automobiles sent abroad. He explained that the diesel engine has been improved to a point where its flexibility may be compared with that of the standard gasoline engine. Mr. Mangan said the need for diesel power in transportation has become acute in many parts of the world, and U. S. diesel engine production should set new records, especially with German and Austrian competition removed. Many German sources will be taken over for reconstruction by Russia alone, he added.

Buda's diesel engine line in export field runs from 20 to 30 hp, largely for portable light plants, vehicles and boats. Postwar export business should run about 70 pct diesel engine and 30 pct rail equipment, it is estimated.

Buda also has developed diesel rail passenger cars for use abroad, especially in South America, in sizes to accommodate 20, 30, 40 and 50-passenger loads.

Mr. Mangan said that for the short term, the Latin American countries should provide responsive markets. He said, "The pent-up markets in many countries for various items, such as automobiles, heavy machinery, radios, ice boxes and the like, will make big demands on our production and distributive capacities. Many American companies that before the war had from 10 to 15 pct of total volume in export are now setting up organizations to care for as much as 30 pct export business."

Security Rules Hamper India Buying Mission

New York

• • • **A delegation** representing a large segment of India's manufacturing industry arrived last week in the United States to place contracts for equipment and supplies for textile, sugar, paper, jute, automobile, bicycle, electrical and other engineering plant.

Arriving by way of the British Isles, the delegation, headed by J. R. D. Tata and G. D. Birla, has been intending to weigh manufacturing facilities here, together with factors such as price and financial accommodations, against those of the British. Finding access to plants here barred by continuing military security restrictions, the mission left for Washington over the week-end in order to meet with State, Commerce and FEA officials who might be in a position to cut red tape.

The delegation considers an inspection of plant facilities imperative before placement of orders. Inability to pursue this objective might make it necessary to conclude arrangements with British producers, it was said by Mr. Birla.

The more important companies interested in buying through this delegation are:

Birla Cotton Mills Ltd., Delhi.
Jiyajeerao Cotton Mills Ltd., Gwalior.
Sutlej Cotton Mills Ltd., Okara.
Technological Institute of Textile, Bhiwani.
Kesoram Cotton Mills Ltd., Calcutta.
Birla Jute Mfg. Co., Ltd., Birlapur, 24 Parganas.
Hind Cycles Ltd., Worli, Bombay.
Texmaco (Engineering), Calcutta.
Texmaco (Engineering), Gwalior.
Hargaon Sugar Mills.
Sidhwalia Sugar Mills.
Narkatiaganj Sugar Mills.
Hassanpur Sugar Mills.
Seohara Sugar Mills.
Orient Paper Mills, Brajrajnagar, Bihar.
Hindustan Motors Ltd., Okha.
Indian Shipping.

While in New York, Mr. Tata is stopping at the Plaza Hotel and Mr. Birla at the Waldorf-Astoria.

Army Restores Plant to Ward

Springfield, Ill.

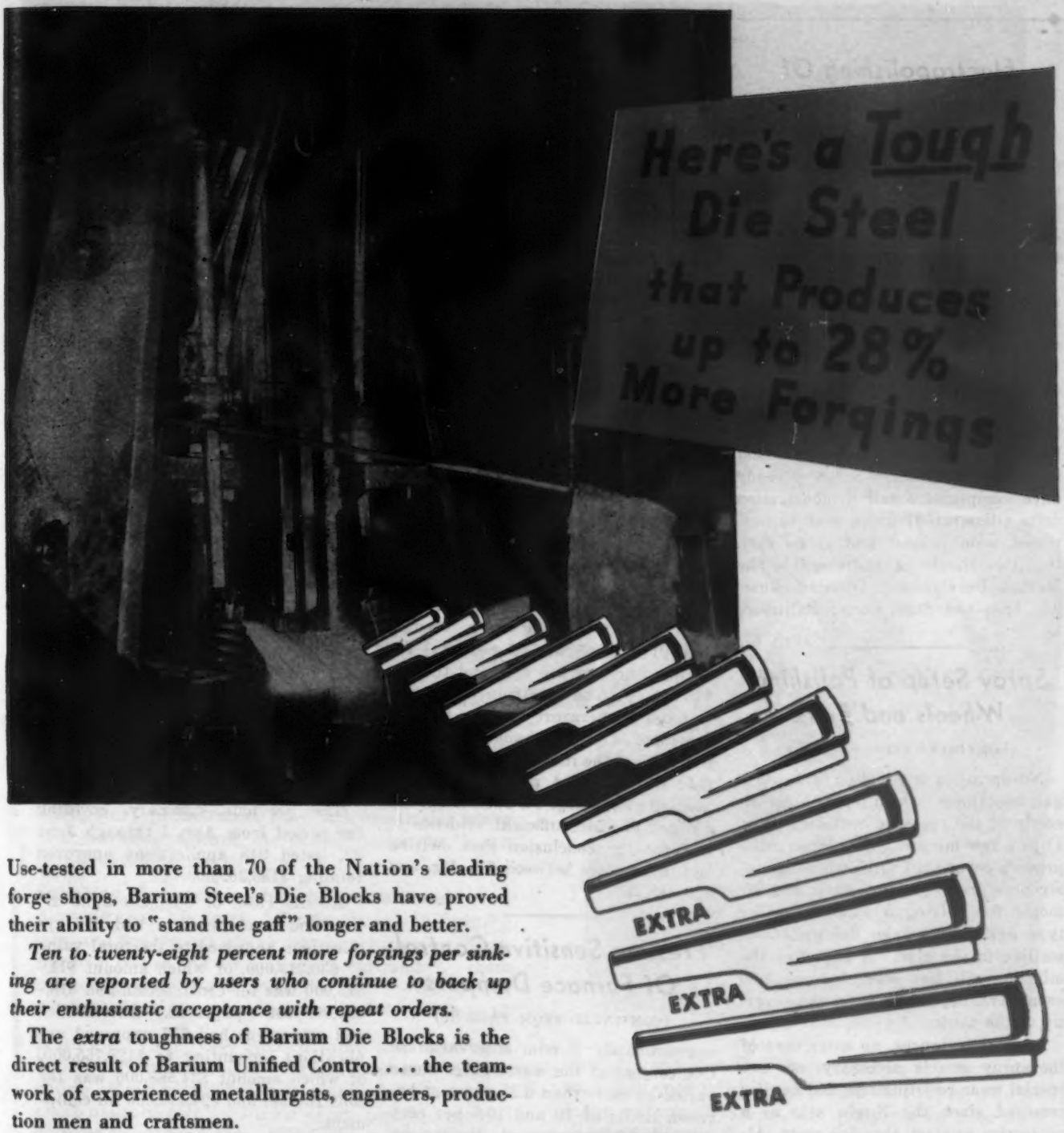
• • • **Hummer Mfg. Co.** was restored to Montgomery Ward control by the Army July 2. Army control of the plant was taken May 20, 1944, upon the order of the late President Franklin D. Roosevelt following a 17-day strike of 450 AFL machinists over Ward's refusal to accede to a War Labor Board order. The order would have granted workers maintenance of union membership.

The new FLASH-O-LENS offers foundry-men, machinists, and many others engaged in producing metal parts for war contracts an efficient, economical means of examining the most minute defects during routine inspections.

FLASH-O-LENS consists of a portable 40x microscope combined with a perfect source of illumination in one convenient, compact unit . . . They are available in several models—powered by either standard flash light dry cells or by current from any AC or DC outlet—and with a selection of various combinations of lenses, all interchangeable in the one lens housing.

Send today for illustrated catalog describing the new FLASH-O-LENS

E. W. PIKE & COMPANY
Manufacturers ELIZABETH, N. J.



Use-tested in more than 70 of the Nation's leading forge shops, Barium Steel's Die Blocks have proved their ability to "stand the gaff" longer and better.

Ten to twenty-eight percent more forgings per sinking are reported by users who continue to back up their enthusiastic acceptance with repeat orders.

The *extra* toughness of Barium Die Blocks is the direct result of Barium Unified Control . . . the teamwork of experienced metallurgists, engineers, production men and craftsmen.

BARIUM UNIFIED CONTROL guards the metal's progress from raw material to a finished product of an analysis that meets specifications exactly. The inevitable result is a die steel of *correct grain structure* and of the *required hardness.*

* * *

Barium Hammer Piston Rods are worthy companions of the die blocks. Also made under Barium Unified Control, they have registered remarkable records of durability.

* * *

If you have a *tough* problem in heavy steel forging —put it in a blueprint and send it to Barium. Your inquiries are welcome.

BARIUM
STEEL CORPORATION

Dept. I
CANTON 1, OHIO

Producers and Forgers of Carbon, Alloy and Stainless Steels

Electropolishing Of Stainless Steel

(CONTINUED FROM PAGE 64C)

blast a machine-buffed article and then electropolish it. The result has been a strikingly lustrous surface. Masks can be applied and a two-toned effect obtained (see photo).

Rustless is primarily a producer of stainless steels and naturally its primary interest is to expand the use of stainless steels. To this end it is offering non-exclusive licenses on the electropolishing process on a royalty-free basis to interested and qualified manufacturers. Engineers from the Baltimore plants will not only assist in these installations, but already have completed small demonstration units (illustrated) which may be borrowed upon request and at no cost. Inquiries should be addressed to the Market Development Division, Rustless Iron and Steel Corp., Baltimore 13.

Spray Setup of Polishing Wheels and Buffs

(CONTINUED FROM PAGE 55)

Nu-Spra-Glu is supplied in 1 and 5 gal. containers, which may be set directly in the pressure container (Fig. 1) in a few minutes. The latter comprises a cover held with swing clamps, air pressure regulator, gage and air motor for driving a small propeller type agitator to keep the grit from settling in the glue. A gallon of the mixture will last several hours and even days, depending upon the severity of the work.

In most instances, no extra care of the spray gun is necessary, nor are special wear resisting tips and needles required since the Nuglu acts as a protection against abrasive wear. Although common sense dictates that the hose line and gun be washed out with water at the end of the day, even if left overnight without cleaning, the gun will operate at once the next morning.

Microscopy of Lead-Bearing Steels and Irons

(CONTINUED FROM PAGE 48)

this technique the inclusions appeared white and smooth.

The polished specimens were etched in a reagent* suggested by von Vegesack for studying the distribution of lead in steel. Under normal illumination the inclusions appeared greenish-yellow, and under dark-ground illumination bright yellow. This reagent resulted in an apparent enlargement of the inclusions, probably owing to the precipitation of minute crystals of lead iodide around them. Etched in a 10 per cent aqueous solution of chromic acid for about 10 min., the inclusions had a reddish appearance under normal illumination.

Polished specimens of lead-bearing materials were treated for 1 hr. in mercury held at 212 deg. F. This treatment removed the white inclusions but other inclusions were not removed or attacked by this treatment.

Some experiments were carried out to ascertain whether any significant change in appearance of the inclusions occurred when a polished specimen was heated slightly above the melting point of lead (621 deg. F.), A specimen of the wrought nickel-chromium steel was chosen as the inclusions were relatively large. The specimen was examined as polished, then after heating in a vacuum (0.0001 to 0.005 mm. of mercury) for 15 min., first at 615 deg. and then at 626 deg. F. The specimen was cooled to room temperature between the two heatings. A slight change in the appearance of the inclusions in a marked field was observed, particularly after heating at 626 deg. F., but the change did not provide sufficient evidence to warrant the conclusion that melting had taken place between 615 deg. and 626 deg. F.

Pressure Sensitive Control Of Furnace Dampers

(CONTINUED FROM PAGE 61)

approximately 3 min. intervals, the CO_2 content of the waste gases never varied by more than 0.25 per cent between limits of 10 and 10.5 per cent which within practical limitations can be said to be a straight line CO_2 curve. The maintenance of constant waste gas and consequently furnace chamber atmosphere conditions is of vital importance in the heat treatment of metals for the avoidance either of excessive oxidation or surface decarburization.

To obtain the virtually perfect combustion conditions as illustrated by the graph, the natural draft furnace used for the test was fitted with automatic control of the air supply, involving some minor additions to the maker's normal design of natural draft furnace. The primary and secondary air supply to each natural draft burner provided on the furnace is mechanically operated from the automatic temperature control equipment in the following way: When the furnace is "on gas" any required amount of air can be admitted through the primary and secondary air slides respectively, but the arrangement is such that when the furnace comes on to "turn-down," the primary air slides are fully closed, eliminating any possibility of lighting back troubles, while the secondary air slides are closed the requisite proportion to ensure the maintenance of the same combustion conditions "on turn-down" as had previously been set "on gas."

Reconversion Grants By WPB Total 1120

Washington

• • • **Pursuing its policy of granting preferential ratings for construction and equipment materials necessary for industrial reconversion, the War Production Board said it had approved 1120 new applications totaling $199,524,000 from Apr. 1 through June 29, under Priorities Regulation 24 and Direction 5 to Conservation Order L-41.**

The previous summary, covering the period from Apr. 1 through June 22, listed 948 applications approved totaling $183,369,000.

At the close of business June 29, iron and steel products had 257 applications approved to the total value of $30,319,000, of which amount $11,825,000 was for construction and $18,494,000 for equipment. Automobiles and equipment had 257 approved applications amounting to $128,765,000, of which amount $34,588,000 was for construction and $94,177,000 for equipment.

Machinery other than electrical ranked third with 231 approved applications at a total value of $25,309,000, of which amount $7,841,000 was for construction and $17,468,000 for equipment.

Geographically, Michigan continued to retain its lead with a total of 278 approved applications valued at $102,916,000, reflecting chiefly requests from the automotive industry. Ohio was second with 181 approved applications valued at $16,660,000. Indiana, Illinois and New York were third, fourth and fifth, respectively in terms of value, with 97, 92 and 93 applications approved valued at $16,438,000; $9,240,000 and $7,528,000, respectively.

The little yellow men who come out of this war alive will never forget—or forgive—our "Water Buffalo." And small wonder! "Water Buffalos" and their "Alligator" predecessors have led practically every U S. invasion against the islands stolen by Japan in her winning days.

Smashing over reefs he thought no craft could pass, plowing over his beach defenses, expelling fighting men and equipment where they hurt him most, blasting him out of the air and off the ground . . . these sea-going tanks have been the Nip's ever-present nightmare since our conquest of Guadalcanal.

Naturally, your Navy needed more and more such superb fighting machines. So Food Machinery Corporation, their originator, put plant after plant into their manufacture . . . tried every possible method to turn them our faster. And high on the list of the methods that *worked* was painting with DeVilbiss Spray Equipment that saved incalculable man-hours.

Whether your conversion to peacetime production must wait until the "Water Buffalos" have taken the last Jap-held beach or whether it's going on

now . . . see how DeVilbiss can save *you* time and money in *your* finishing department. In spray equipment, exhaust systems, air compressors, hose and connections—everything for the complete spray painting system—count on DeVilbiss' advanced engineering and DeVilbiss' 57 years of spray experience to give you something *better.*

THE DEVILBISS COMPANY, TOLEDO 1, OHIO
Canadian Plant: Windsor, Ontario

DE VILBISS
Spray Systems

SPRAY EQUIPMENT • EXHAUST SYSTEMS • AIR COMPRESSORS • HOSE & CONNECTIONS

MACHINE TOOLS

. . . News and Market Activities

Machinery Institute Head Scores SPB

New York

• • • Failure of the Surplus Property Board to alleviate the acute machine tool problem was scored recently by Herbert I. Segal, general manager of Hasco Machinery Co., Newark, and executive chairman of Machinery Dealers Institute, New York City.

Mr. Segal said that some progress has been made but "too little to make a real dent. A failure in this field would have serious repercussions on our economic system in the postwar period."

Mr. Segal particularly condemned the Clayton Formula which guides the SPB, and maintained that this policy creates an "artificial selling price basis for machine tools. The entire program is a dismal failure and impedes the RFC organization in making sales.

"The plan fixes selling prices without considering the desirability of the machine tools either as to model, style, make or condition. The RFC organization is composed of men with outstanding ability but they are puppets as a result of the Clayton Formula. Furthermore, Clayton's policy prohibits a distinction between war orphan tools and tools of the highest calibre. The SPB must drop the Clayton Formula if it is to accomplish any good with the machine tool problem."

He further stated that: "The facts are simple enough. At the beginning of 1940 there were in this country 941,898 machine tools, according to William P. Kirk, vice-president of Pratt & Whitney Machinery Dept. Of these 682,801 were over 15 yr old and 259,097 were from 6 to 15 yr old.

"From 1940 through 1945 there were produced 810,000 machine tools giving this country an overall total of 1,751,898 tools. This is double to what was in existence prior to our entry into the war.

"The nature of the increase in these tools can be judged by referring to automatic screw machines, a quantity production machine. The total number of automatic screw machines in this country was 20,000 before the war. Since then the records show an additional 34,000, according to O. B. Werntz, executive secretary of the National Screw Products Assn.

"There are now in this country approximately 46,000 screw machines of which 26,000 are less than five year old. This is more than the gross total before the war when we had 9000 screw machines over 20 yr old, 6000 from 10 to 20 yr, and 5000 from 5 to 10 yr."

Mr. Segal said that this tremendous increase of production capacity should enable "industry to produce better products for a cheaper price and create more employment. This cannot be done unless we settle our machine tool problem."

Last year, Mr. Segal presented a "Plan for Disposition of Government Owned Machine Tools." This plan was commended by deans of engineering colleges throughout the nation and by high ranking industrialists. The plan specifically "called for an inventory but only now is Lt. Col. Edward H. Heller of the surplus Property Board calling for an inventory, one of the simplest and most elementary points of business.

"The export market for machine tools is great but only the older tools should be sent abroad. The more modern types should be kept here for our own use. France alone is in the market for approximately 50,000 machine tools but specifying that these tools will have to be on an average of less than 12 yr old."

He warned against scare propaganda in dealing with the machine tool problems. "The surpluses from the Armed Forces sound like big figures but these tools will be absorbed in the first big movement of reconversion with eliminations, changes and additions. As a matter of fact we may find ourselves in need of many standard type tools.

"As of Apr. 15, according to Walter E. Joyce, assistant director, Surplus Property of RFC, there were reported surplus on hand 14,893 machine tools and 16,738 production items. This sounds large. but for a country such as ours with over 30,000 shops using standard machine tools, the figures are not frightening."

Mr. Segal said that a good portion of the surplus could be turned over to our educational systems where there is a great need of these tools.

He scored the ignoring of the dealers "who are in a good position to help the government solve the machine tool problem. In this country there are more than 1000 dealers whose principals and salesmen know every shop, every shop foreman, every production engineer. Here is a ready made organization which could be of immeasurable help to the government but so far the SPB policy has been to ignore this group."

The current policies of the SPB "are injurious to the small business man. The current situation should be to the small businesses' advantage but it is anything but that."

Mr. Segal concluded that the "present approach to the problem causes confusion and dislocation of industry. The so-called over-production or surplus of machine tools may and should turn out to be a boon to this country. Properly treated, properly harnessed, we have a greater asset than before the war."

•

To Sell Machine Tool Items

Chicago

• • • Sale of 72 items of new small machine tools and miscellaneous equipment manufactured for the Army Air Forces will be conducted by the Surplus Property Division of Reconstruction Finance Corp., 208 South LaSalle St., Chicago 4, under a listing of June 28. All equipment packed in original crates, is located at the 847th AAF depot, Springfield, Ill. Included are 97 Magnaflux magnetic inspection units for ferrous metals.

•

Machine Tool Order Revoked

Washington

• • • Revocation of general limitation order L-147, which prohibited special electrical specifications for machine tools, except in specified circumstanes, since July 15, 1942, has been made by the War Production Board. The manufacture and delivery of machine tools remain subject to all other applicable WPB orders and regulations.

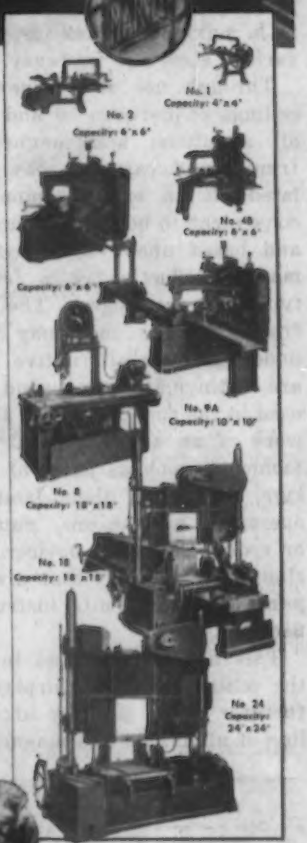
NOW CRUCIBLE STEEL WAREHOUSES DELIVER

—*any size, any length "from stock"*

With their modern high speed MARVEL Hack Saws the Crucible Steel Company's Warehouses can deliver orders "from stock", whether for a few miscellaneous lengths, a thousand alloy steel gear blanks, a single tool steel disc 18 inches in diameter, or other lengths or slices accurately cut-off from any type bar stock.

In their Indianapolis quick service Warehouse shown above they have two No. 9A MARVEL Automatic Bar Feed Sawing Machines (capacity 10" x 10") and one No. 18 MARVEL Universal Roll Stroke Hydraulic Saw (capacity 18" x 18"). The high speed 9A will cut-off identical pieces from single or nested bars automatically with no more operator attention than an automatic screw machine requires. They can be stopped at any point in a quantity run; a miscellaneous cut made; and the quantity run resumed by simply disengaging and reengaging the automatic feed. The No. 18 "Roll Stroke" Hydraulic Saw handles the heavy stuff—will quickly cut-off the largest and toughest bars.

The Crucible Steel Company, like many others, have found the MARVEL Hack Saw method fast, accurate and economical; and that it requires no special skill on the part of the operator.



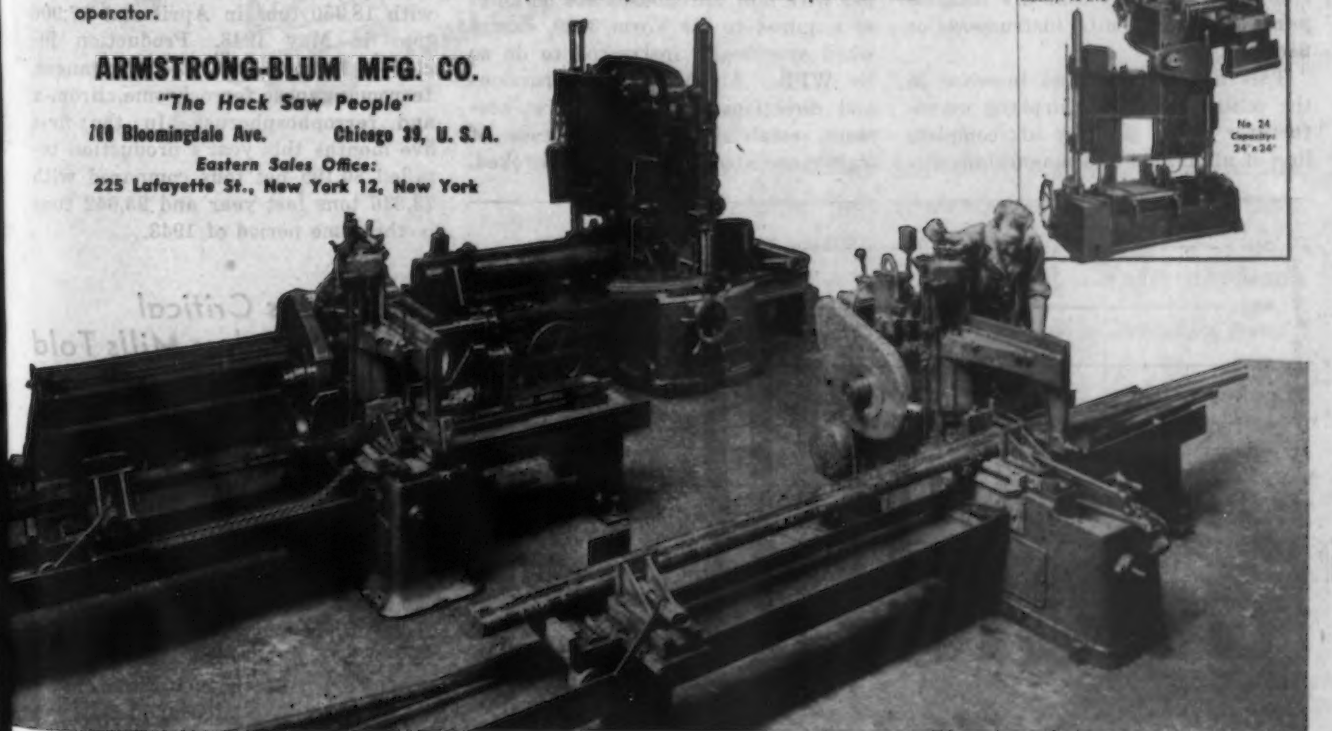
ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

700 Bloomingdale Ave. Chicago 39, U. S. A.

Eastern Sales Office:

225 Lafayette St., New York 12, New York



NON-FERROUS METALS

. . . News and Market Activities

New Pricing Method For Light Metal Castings

Washington

• • • A new alternative method of determining foundry dollar and cent ceiling prices for aluminum and magnesium airframe and castings has been announced by OPA. Under the new method, effective July 14, producers are provided with dollar and cent base prices to which extras and premiums may be added to determine f.o.b. maximum prices for castings of various sizes and intricacy.

Through use of the new method, ceilings on between 80 and 90 pct of all aluminum and magnesium airframe sand castings may be calculated on an easily computed basis convenient to both buyers and sellers, and based upon the industry's estimated production costs for various types of castings. The airplane frame castings that may be priced under the new alternative procedure are castings made in a sand mold and used in the construction of the framework of an airplane or airplane attachment, such as parts of the fuselage, wings, tail plane, landing gear, operating mechanisms, gun mounts, or rocket launching devices. Not included are castings that are integral parts of power plants, instruments or firearms.

This action brings no increase in the ceiling prices an airplane manufacturer would pay for his complete line of aluminum and magnesium airframe sand castings for an airplane frame.

Use of the new method, however, is optional. Foundries, if they desire, may continue to use their present "freeze" prices, which generally are the highest prices they charged during October 1-15, 1941, less the required reduction of 3c. per lb.

•

Wire Mill Warehouse Procedures Outlined

Washington

• • • Procedures to be followed by copper wire mill warehouses in replacing, establishing and increasing stocks, now that the CMP has been open-ended, have been outlined by WPB. The procedures are set forth in Direction 4 to CMP Regulation 4 and deal with the replacement of copper wire mill products delivered on authorized controlled material orders which are in the categories of warehouse stock replacement order or warehouse deferred (ZW) order; the placement of unrated orders to establish or increase stock; and the treatment of the several types of copper wire mill warehouse orders by controlled material producers and other warehouses.

By a provision of the direction, copper wire mill warehouses are no longer required to file Form 3009, except when specifically instructed to do so by WPB. All previous instructions and directions dealing with replacement, establishment, or increase of warehouse stocks have been revoked.

Die Casting Machinery Producer Established

Erie, Pa.

• • • Light Metal Machinery, Inc., a new firm here, is about to engage in manufacture and distribution of machinery for fabricating zinc, aluminum, magnesium and other light metal alloys.

Machines projected are a new type of high speed, light weight zinc die casting machine, an automatic, adjustable trimming machine for removing gates and flash from die castings, and a new type of heavy-duty die casting machine. Announcement of the small, high speed machine will be made within 30 days.

President of the new concern is Ward F. Martin, former president of the G. & N. Manufacturing Co. of Cleveland, and until recently, in charge of die casting machine sales for the Cleveland Automatic Machine Co.

•

Canadian Ferroalloys Production Up in May

Toronto

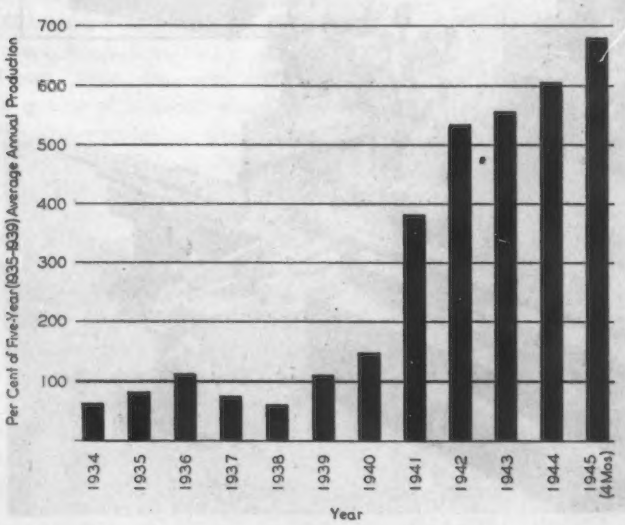
• • • In May, output of ferroalloys totalled 19,883 net tons compared with 18,350 tons in April and 17,906 tons in May 1943. Production included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus. In the first five months this year's production totalled 80,199 net tons compared with 73,336 tons last year and 93,642 tons in the same period of 1943.

•

Nickel Less Critical Stainless Mills Told

Washington

• • • The supply of critical alloying materials has improved and the military demand for stainless steel products has decreased, WPB officials recently told the Stainless Steel Industry Advisory Committee. WPB reported that the lessening of requirements of other countries for essential nickel needs had eased the situation here. Nickel accounts for approximately 8 pct of the materials entering into the production of most types of stainless steel.

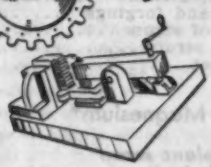


BRASS FORGING GROWTH: *Taking the five-year period starting in* 1935 *as base, brass forging production during the war years has multiplied four to six times according to the Brass Forging Assn. The sevenfold expansion shown for* 1945 *is based on four months' statistics extended for the full year.*

The Kind of Job Colonial Broaches helped to do.....

1 CUT COSTS OF AUTOMATIC RIFLES 57%

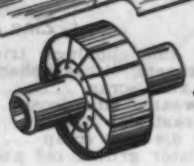
2 BOOST TANK SPROCKET PRODUCTION 300% WITHOUT INCREASE IN MAN POWER OR MACHINES



3 MACHINE 7 DIFFERENT PARTS IN 60 SIZES ON ONE MACHINE

4 PRODUCE SPLINE FITS WITH "ZERO" BACKLASH

5 MAKE ONE BROACHING MACHINE DO THE WORK OF 3, 6 OR MORE MILLING MACHINES



6 TURN OUT PARTS IN PRODUCTION TO TOOL ROOM PRECISION

Those are just a few typical examples. Colonial field engineers can help you cut costs, boost output, or increase precision. A call, a letter or a wire to Colonial will pay dividends.

Are you on the mailing list to receive "Broaching News"?

colonial BROACH COMPANY
DETROIT 13, U.S.A.

Broaches — Broaching Machines - Broaching Equipment

Primary Metals

(Cents per lb., unless otherwise noted)

Aluminum, 99+%, del'd (Min. 10,000 lb.)	15.00
Antimony, American, Laredo, Tex.	14.50
Beryllium copper, 3.75-4.25% Be dollars per lb. contained Be	$17.00
Cadmium, del'd	90.00
Cobalt, 97-99% (per lb.)	$1.50 to $1.57
Copper, electro, Conn. valley	12.00
Copper, electro, New York	11.75
Copper, lake	12.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$3.00
Iridium, dollars per troy oz.	$120.00
Lead, St. Louis	6.35
Lead, New York	6.50
Magnesium, 99.9 + %, carlots	20.50
Magnesium, 12-in. sticks, carlots	27.50
Mercury, dollars per 76-lb. flask, f.o.b. New York	$145.00 to $149.00
Nickel, electro	35.00
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per oz.	$35.00
Silver, open market, New York, cents per oz.	44.75
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.65

Remelted Metals

(Cents per lb. unless otherwise noted)

Aluminum, No. 12 Fdy. (No. 2)	9.00 to 10.00
Aluminum, deoxidizing No. 2, 3, 4	$6.00 to 9.50
Brass Ingot	
85-5-5-5 (No. 115)	13.25
88-10-2 (No. 215)	16.75
80-10-10 (No. 305)	16.00
No. 1 Yellow (No. 405)	10.25

Copper, Copper Base Alloys

(Mill base, cents per lb.)

	Extruded Shapes	Rods	Sheets
Copper	20.87	....	20.37
Copper, H.R.	....	17.37	....
Copper drawn	....	18.37	....
Low brass, 80%	....	20.40	20.15
High brass	....	....	19.48
Red brass, 85%	....	20.61	20.36
Naval brass	20.37	19.12	24.50
Brass, free cut	....	15.01	....
Commercial bronze, 90%	....	21.32	21.07
Commercial bronze, 95%	....	21.53	21.28
Manganese bronze	24.00	....	28.00
Phos. bronze, A, B, 5%	....	36.50	36.25
Muntz metal	20.12	18.87	22.75
Everdur, Herculoy, Olympic or equal	....	25.50	26.00
Nickel silver, 5%	....	28.75	26.50
Architect bronze	19.12	....	....

Aluminum

(Cents per lb., subject to extras on gage, size, temper, finish, factor number, etc.)

Tubing: 2 in. O.D. x 0.065 in. wall 2S, 40c. (½H); 52S, 61c. (O); 24S, 67½c. (T).

Plate: 0.250 in. and heavier; 2S and 3S, 21.2c.; 52s, 24.2c.; 61S, 22.8c.; 24S, 24.2c.

Flat Sheet: 0.188 in. thickness; 2S and 3S, 22.7c. a lb.; 52S, 26.2c.; 61S, 24.7c.; 24S, 26.7c.

2000-lb. base for tubing; 30,000-lb. base for plate, flat stock.

Extruded Shapes: "As extruded" temper; 2000-lb. base, 2S and 3S, factor No. 1 to 4, 25.5c.; 14S, factor No. 1 to 4, 35c.; 17S, factor No. 1 to 4, 31c.; 24S, factor No. 1 to 4, 34c.; 53S, factor No. 1 to 4, 23c.; 61S, factor No. 1 to 4, 28½c.

The factor is determined by dividing perimeter of shape by weight per lineal foot.

Wire Rod and Bar: Base price; 17ST and 11ST-3 screw machine stock. Rounds: ¼ in., 28½c. per lb.; ½ in., 26c.; 1 in., 24½c.; 2 in., 23c. Hexagonals: ¼ in., 34½c. per lb.; ½ in., 28½c.; 1 in., 25½c.; 2 in., 25½c. 2S, as fabricated, random or standard lengths. ¼ in., 24c. per lb.; ½ in., 25c.; 1 in., 24c.; 2 in., 23c. 24ST, rectangles and squares, random or standard lengths. 0.093-0.187 in. thick by 1.001-2.000 in. wide, 33c. per lb.; 0.751-1.500 in. thick by 2.001-4.000 in. wide, 29c.; 1.501-2.000 in. thick by 4.001-6.000 in. wide, 27½c.

Magnesium

Sheet, rod, tubes, bars, extruded shapes subject to individual quotations. Metal turnings: 100 lb. or more, 46c. a lb.; 25 to 90 lb., 56c.; less than 25 lb., 66c.

NONFERROUS SCRAP METAL QUOTATIONS

†*(OPA basic maximum prices, cents per lb., f.o.b. point of shipment, subject to quality, quantity and special preparation premiums—other prices are current quotations)*

Copper, Copper Base Alloys

OPA Group 1†

No. 1 wire, No. 1 heavy copper	9.75
No. 1 tinned copper wire, No. 1 tinned heavy copper	9.75
No. 2 wire, mixed heavy copper	8.75
Copper tuyeres	8.75
Light copper	7.75
Copper borings	9.75
No. 2 copper borings	8.75
Lead covered copper wire, cable	6.00*
Lead covered telephone, power cable	6.04
Insulated copper	5.10*

OPA Group 2†

Bell metal	15.50
High grade bronze gears	13.25
High grade bronze solids	11.50*
Low lead bronze borings	11.50*
Babbitt lined brass bushings	13.00
High lead bronze solids	10.00*
High lead bronze borings	10.00*
Red trolley wheels	10.75
Tinny (phosphor bronze) borings	10.50
Tinny (phosphor bronze) solids	10.50
Copper-nickel solids and borings	9.25
Bronze paper mill wire cloth	9.50
Aluminum bronze solids	9.00
Soft red brass (No. 1 composition)	9.00
Soft red brass borings (No. 1)	9.00
Gliding metal turnings	8.50
Contaminated gilded metal solids	8.00
Unlined standard red car boxes	8.25
Lined standard red car boxes	7.75
Cocks and faucets	7.75
Mixed brass screens	7.75
Red brass breakage	7.50
Old nickel silver solids, borings	6.25
Copper lead solids, borings	6.25
Yellow brass castings	6.25
Automobile radiators	7.00
Zincy bronze borings	8.00
Zincy bronze solids	8.00

OPA Group 3†

Fired rifle shells	8.25
Brass pipe	7.50
Old rolled brass	7.00
Admiralty condenser tubes	7.50
Muntz metal condenser tubes	7.00
Plated brass sheet, pipe reflectors	6.50
Manganese bronze solids	7.25[1]
Manganese bronze solids	6.25[2]
Manganese bronze borings	6.50[1]

OPA Group 4†

Refinery brass	4.75*

*Price varies with analysis. [1] Lead content 0.00 to 0.40 per cent. [2] Lead content 0.41 to 1.00 per cent.

Other Copper Alloys

Briquetted Cartridge Brass Turnings	8.625
Cartridge Brass Turnings, Loose	7.875
Loose Yellow Brass Trimmings	7.875

Aluminum

Plant scrap, segregated

2S solids	8.00
Dural alloys, solids 14, 17, 18, 24S 25S	4.50
turnings, dry basis	3.00
Low copper alloys 51, 52, 61, 63S solids	7.50
turnings, dry basis	5.75

Plant scrap, mixed

Solids	4.00
Turnings, dry basis	2.75

Obsolete scrap

Pure cable	8.00
Old sheet and utensils	6.00
Old castings and forgings	5.00
Pistons, free of struts	5.00
Pistons, with struts	3.00
Old alloy sheet	5.00

Magnesium*

Segregated plant scrap

Pure solids and all other solids, exempt	
Borings and turnings	1.50

Mixed, contaminated plant scrap

Grade 1 solids	3.00
Grade 1 borings and turnings	2.00
Grade 2 solids	2.00
Grade 2 borings and turnings	1.00

*Nominal.

Zinc

New zinc clippings, trimmings	6.50
Engravers, lithographers plates	6.50
Old zinc scrap	4.75
Unsweated zinc dross	5.00
Die cast slab	4.50
New die cast scrap	4.45
Radiator grilles, old and new	3.50
Old die cast scrap	3.00

Lead

Deduct 0.55c. a lb. from refined metal basing point prices or soft and hard lead including cable, for f.o.b. point of shipment price.

Nickel

Ni content 98+%, Cu under ½%, 26c. per lb.; 90 to 98% Ni, 26c. per lb contained Ni.

ELECTROPLATING ANODES AND CHEMICALS

Anodes

(Cents per lb., f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer	25½
Electrodeposited	18⅞
Rolled, oval, straight	19½
Curved	20⅝
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer	23⅝
Zinc, cast, 99.99, 15 in. or longer	16¼
Nickel, 99 per cent plus, frt. allowed	
Cast	47
Rolled, depolarized	48
Silver, 999 fine	
Rolled, 1-9 troy oz., per oz.	58*

Chemicals

(Cents per lb., f.o.b. shipping point)

Copper cyanide, 1-5 bbls.	34.00
Copper sulphate, 99.5, crystals, bbls.	7.75
Nickel salts, single, 425 lb. bbls., frt. allowed	13.50
Silver cyanide, 100 oz. lots	—.4179
Sodium cyanide, 96 per cent, domestic, 100 lb. drums	15.00
Zinc cyanide, 100 lb. drums	33.00
Zinc sulphate, 89 per cent, crystals, bbls., frt. allowed	6.35

*Price based on use of foreign silver.

Investigate

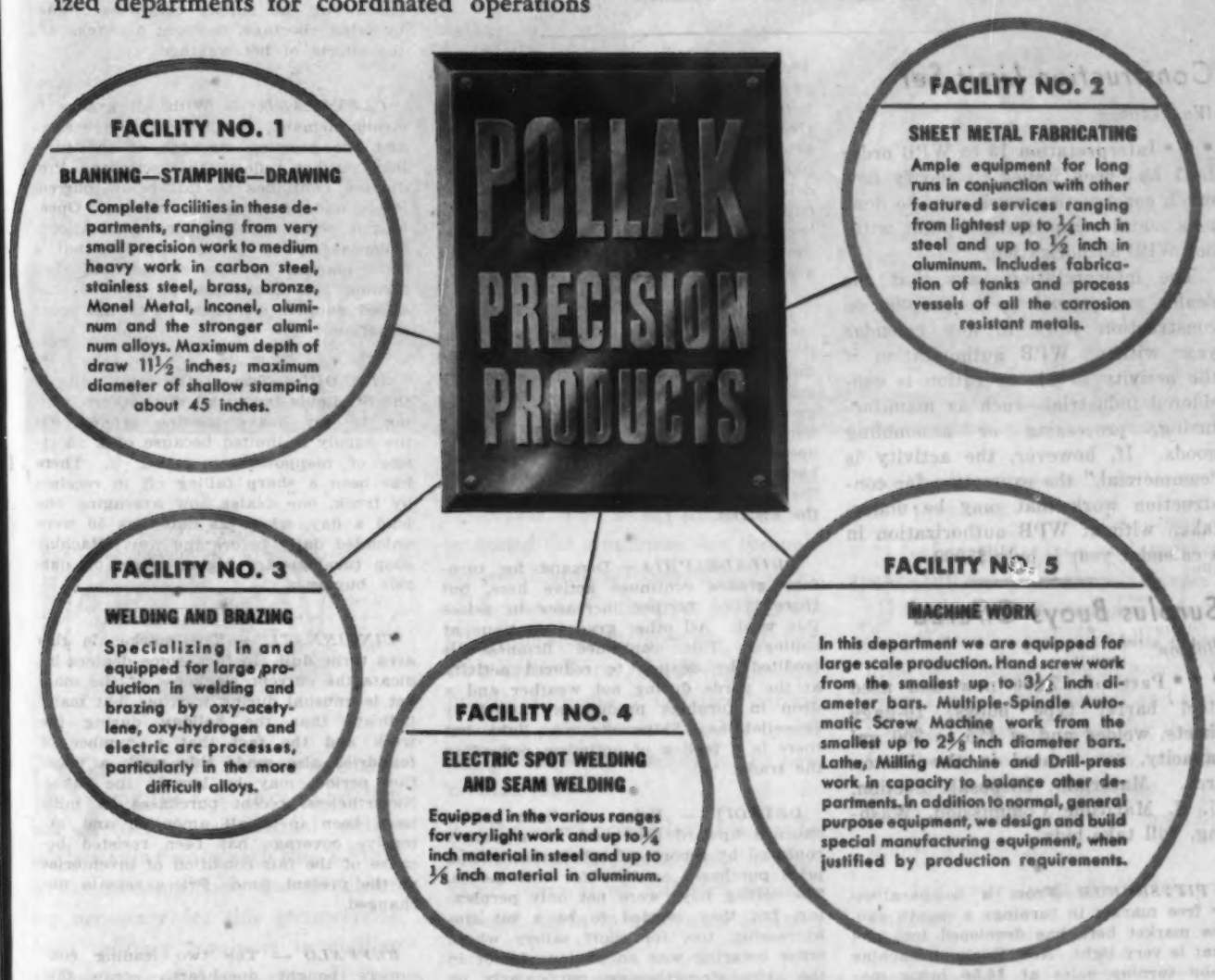
POLLAK'S CO-RELATED FACILITIES

FOR MANUFACTURE OF PRODUCTS AND ASSEMBLIES FOR POSTWAR PRODUCTION

Looking ahead to the time when materials and manpower can again be devoted to industrial production, we list below some of the specialized features of Pollak facilities.

Pollak has ample equipment in these specialized departments for coordinated operations to turn out complete products and assemblies.

Pollak also has engineering and research facilities for designing and building complete products preparatory for production, *when our plants are released from war work.*


POLLAK
PRECISION
PRODUCTS
FACILITY NO. 1
BLANKING—STAMPING—DRAWING
Complete facilities in these departments, ranging from very small precision work to medium heavy work in carbon steel, stainless steel, brass, bronze, Monel Metal, Inconel, aluminum and the stronger aluminum alloys. Maximum depth of draw 11½ inches; maximum diameter of shallow stamping about 45 inches.
FACILITY NO. 2
SHEET METAL FABRICATING
Ample equipment for long runs in conjunction with other featured services ranging from lightest up to ¼ inch in steel and up to ½ inch in aluminum. Includes fabrication of tanks and process vessels of all the corrosion resistant metals.
FACILITY NO. 3
WELDING AND BRAZING
Specializing in and equipped for large production in welding and brazing by oxy-acetylene, oxy-hydrogen and electric arc processes, particularly in the more difficult alloys.
FACILITY NO. 4
ELECTRIC SPOT WELDING AND SEAM WELDING
Equipped in the various ranges for very light work and up to ¼ inch material in steel and up to ⅛ inch material in aluminum.
FACILITY NO. 5
MACHINE WORK
In this department we are equipped for large scale production. Hand screw work from the smallest up to 3½ inch diameter bars. Multiple-Spindle Automatic Screw Machine work from the smallest up to 2⅝ inch diameter bars. Lathe, Milling Machine and Drill-press work in capacity to balance other departments. In addition to normal, general purpose equipment, we design and build special manufacturing equipment, when justified by production requirements.

These Pollak facilities are operated in conjunction with other manufacturing departments such as Spinning, Electrical Work, Heat Treating, Assembly and Plating. These individual Pollak facilities are operated as a unit and ordinarily they are available only for work of a nature which will keep this operation in balance. However, this limitation is not always applicable.

POLLAK MANUFACTURING COMPANY

Arlington, New Jersey

SCRAP

. . . News and Market Activities

Blast Furnace Scrap Grades Stronger

New York

• • • Strengthening in blast furnace scrap continues throughout the country with markets generally reporting heavy demand for all scrap grades and rather poor deliveries on contract due to the shortage of yard labor, the hot weather and a reduction in the generation of turnings because of contract cancellations.

Most contracts of Pittsburgh mills for scrap from Eastern areas have expired by this time and since Eastern dealers are readily able to dispose of their supplies at relatively high prices, there is no current activity along the lines of long distance transshipment of scrap.

Current interest in the purchase of turnings seems a commonplace when scrap is selling at relatively high prices. On the other hand, when the market softens the blast furnace grades are one of the earliest indications of weakness.

Construction Limit Set

Washington

• • • Interpretation 13 to WPB order L-41 has been issued to clarify how much construction work may be done in a metal scrap dealer's plant without WPB authorization.

The interpretation says that the dealer may spend up to $25,000 on construction work in any calendar year without WPB authorization if the activity of his operation is considered industrial—such as manufacturing, processing or assembling goods. If, however, the activity is "commercial," the exemption for construction work that may be undertaken without WPB authorization in a calendar year is only $5000.

Surplus Buoys Offered

Boston

• • • Part of 17,000 new and used steel barrel type buoys, 10-gage sheets, welded and of 175 to 300 gal capacity, are located in the Boston area. Materials Disposal Section, U. S. Maritime Commission, Washing, will take bids.

•

PITTSBURGH—From a comparatively free market in turnings a month ago, the market here has developed into one that is very tight. New England machine shop turning sales at $6.50 bring machine shop turnings here at $12.77, and a sale of between 5000 and 7000 tons was reported this week in Mansfield, Ohio, at $14.00, selling at about $11.00 in Detroit. This, however, is a single buy and may not be repeated again in months. With the Chicago market as tight as it now is, the $14.00 price at Mansfield is understandable, since it was in direct competition with Chicago buyers. Some turnings are moving up river from Memphis, at a price of $8.50 to $9.00 delivered. There is active dealer participation in the Pittsburgh scrap market this week, but the mills are relatively quiet and are sticking tight to the prices that have been in effect for the past week and a half. With the foundries being slack as a result of recent cutbacks, low phos is not moving too briskly. There are very few new orders for this item, but orders already out are taking care of production scrap.

•

CHICAGO—Strong market here continues with no signs of weakness while the firming tendency in the secondary grades is progressing steadily. Shipments on allocations have increased slightly but there continues to be a dearth of openhearth material. Dealers blame cutbacks as well as manpower needs for the general scrap shortage that exists in the district.

•

PHILADELPHIA — Demand for turnings grades continues active here, but there is no further increases in prices this week. All other grades continue at ceilings. This continued firmness is credited by dealers to reduced activity at the yards during hot weather and a drop in turnings production caused by cancellations. Shipments are light but there is a feeling of optimism pervading the trade.

•

DETROIT — Prices on light grades churned upward this week in a market confused by reports of substantial ceiling price purchases on lists for this month. The ceiling buys were not only perplexing, but they seemed to be a bit embarrassing, too, for short sellers whose order covering was an obvious factor in the price strengthening, particularly on long turnings. There did not appear to be too much difficulty, however, in obtaining metal at prices well below the ceiling levels paid on the lists. Demand for other grades continued strong.

•

BOSTON—Heavier materials situation is confusing. Eastern Pennsylvania mills, heretofore heavy melting steel price cutters, now pay ceilings. Pittsburgh district mills first paid ceilings, but are now bearing the market through the medium of the springboard. As for bundles, conditions are just the reverse. Buyers paying ceilings get scrap. Those who do not, get little. Turnings and borings prices are firmer although not actually higher. Foundry scrap sells as fast as accumulated by yards. Scrap in general is moving well.

•

NEW YORK—The price of turnings has improved in this market to a range of from $8.50 to $9.00 with relatively small quantities coming out at these prices. Openhearth grades continue to sell at ceiling prices and are also in heavy demand, as are cast grades. All factors in this market are ready to purchase but the supply continues limited by labor shortage, contract cutbacks and the effects of hot weather.

•

CLEVELAND — With all grades in strong demand, scrap is getting scarcer and the growing strength of the turnings market reflects this scarcity. Production continues to fall below current levels and scrap is not moving. Openhearth scrap and foundry grades continue at ceiling prices, rounding out a tight market. A sale of machine shop turnings at Mansfield for $14.00 has added another complication to the order situation.

•

ST. LOUIS—Two of the steel mills in the St. Louis industrial district are willing to buy heavy melting grades, but the supply is limited because of a shortage of manpower to gather it. There has been a sharp falling off in receipts by truck, one dealer now averaging one load a day, where as many as 50 were unloaded daily before the war. Machine shop turnings are higher again on outside buying.

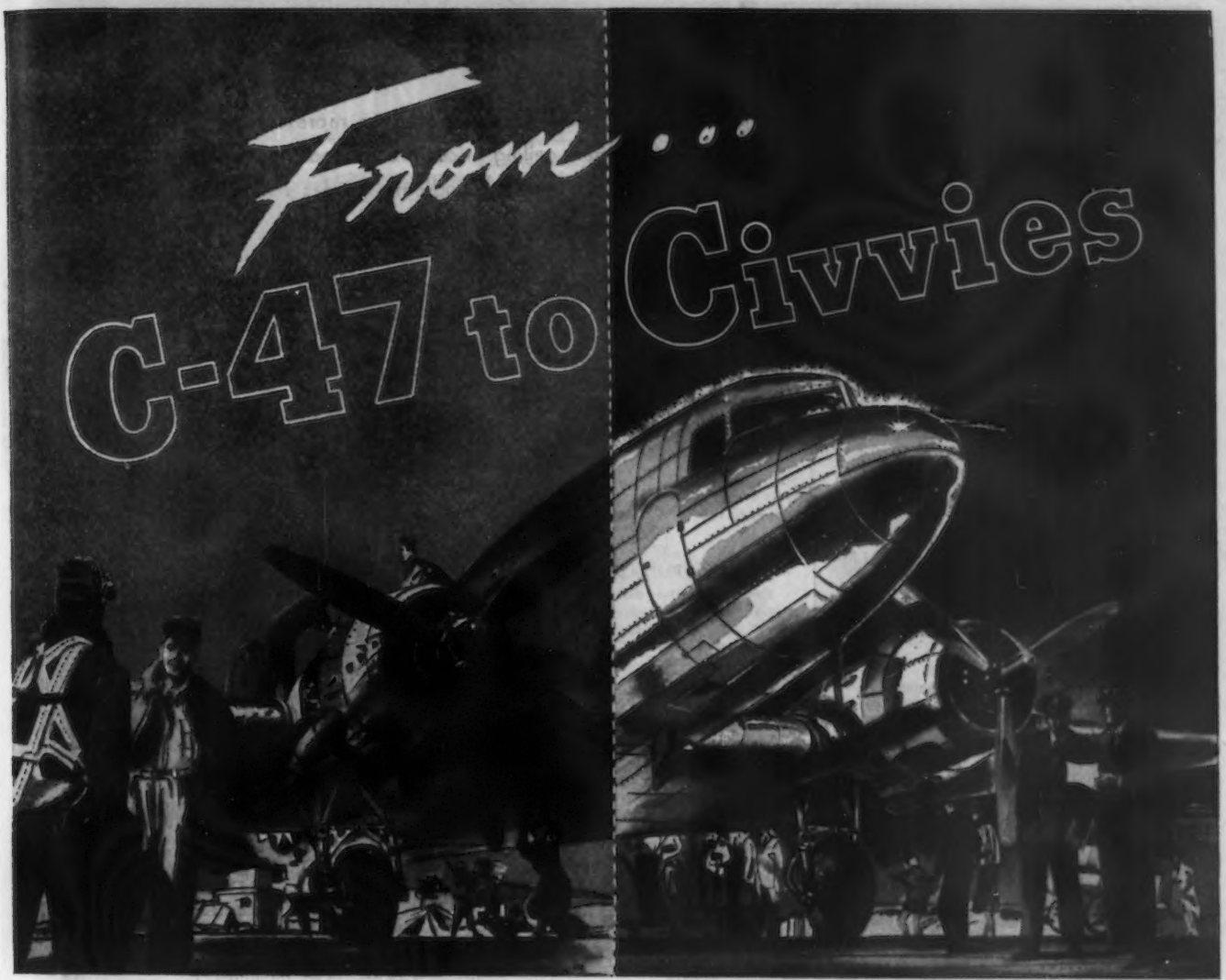
•

CINCINNATI — The market in this area turns dull. In fact, some dealers indicate the current slackness of the market is unusual during wartime, but many indicate that the holiday during the week and the fact that a number of foundries also made this week a vacation period, may be largely the cause. Nevertheless, recent purchases by mills have been in small amounts, and extensive coverage has been resisted because of the fair condition of inventories at the present time. Prices remain unchanged.

•

BUFFALO — The two leading consumers bought openhearth scrap this week at full ceiling, with all allowances including commissions, and blast furnace items jumped 50c. a ton. Orders for approximately 5000 tons of machine shop and short shoveling turnings were placed at $12.50 and $15.50 respectively. Canal shipments continue light, averaging not more than 2500 tons weekly, but the first cargo of steelmaking scrap from the lakehead since the latter part of May is scheduled to come through some time next week.

From . . . C-47 to Civvies



NO TIME IS WASTED in changing the C-47 over to civilian life. A commercial airline job is waiting when each ship's Army service is completed; and the cleaning necessary for this reconversion from military transport to civilian airline is speeded by Kelite pH Control.

Engines are removed for overhauling—a production line job in which tanks of Kelite solutions speed the removal of grease, carbon and scale.

Dirt, oil, grease and exhaust stains are washed and steamed away from the fuselage with specialized Kelite materials. The khaki paint, which protected the aluminum skin through arduous flights, is loosened by a spray of Kelite A. C. Stripper and hosed off. Aluminum surfaces are polished with Kelite Kero, rebuilt engines and interior furnishings installed, airline insignia painted on . . . and a proud Douglas airliner is ready for its new civilian job!

The same principles of scientific cleaning which make possible this rapid removal of stubborn deposits without harm to aluminum surfaces can also be applied to your reconversion problems.

Kelite materials and methods make full use of all the advantages of pH Control. By constant adherence to the pH chart, which accurately measures the cleaning power needed for every type of soil removal and shows the exact limits of safetv for the surface being cleaned, Kelite has taken the guesswork out of cleaning . . . provided a reliable key to a new, high standard of efficiency.

Ask your local Kelite Service Engineer.

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KELITE

SCIENTIFIC CLEANING THROUGH pH CONTROL

KELITE pH Control

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages (for ceiling prices see O. P. A. schedule No. 4). Where ceiling prices are quoted they do not include brokerage fee or adjusted transportation charges. Asterisks indicate grades selling at ceilings.

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
RR. hvy. melting	21.00*
No. 2 hvy. melting	20.00*
RR. scrap rails	21.50*
Rails 3 ft. and under	23.50*
No. 1 comp'd sheets	20.00*
Hand bdld. new shts.	20.00*
Hvy. axle turn.	19.50*
Hvy. steel forge turn.	19.50*
Mach. shop turn.	$12.50 to 13.00
Short shov. turn.	16.00 to 17.00
Mixed bor. and turn.	12.00 to 12.50
Cast iron borings	15.00 to 15.50
Hvy. break cast.	16.00*
No. 1 cupola	20.00*
RR. knuck. and coup.	24.50*
RR. coil springs	24.50*
Rail leaf springs	24.50*
Rolled steel wheels	24.50*
Low phos. bil. crops	25.00*
Low phos.	22.50*
RR. malleable	22.00*

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 1 bundles	18.75*
No. 2 dealers' bndls.	18.75*
Bundled mach. shop turn.	18.75*
Galv. bundles	16.75*
Mach. shop turn.	$13.00 to 13.75
Short shovel. turn.	13.50 to 14.50
Cast iron borings	13.25 to 13.75
Mix. borings & turn.	12.75 to 13.75
Low phos. hvy. forge	23.75*
Low phos. plates	21.25*
No. 1 RR. hvy. melt.	19.75*
Reroll rails	22.25*
Miscellaneous rails	20.25*
Rails 3 ft. and under	22.25*
Locomotive tires, cut	22.50 to 23.00
Cut bolsters & side frames	19.75 to 20.25
Angles & splice bars	22.25*
Standard stl. car axles	23.50 to 24.00
No. 3 steel wheels	23.25*
Couplers & knuckles	23.25*
Agricul. malleable	22.00*
RR. malleable	22.00*
No. 1 mach. cast	20.00*
No. 1 agricul. cast	20.00*
Hvy. breakable cast	16.50*
RR. grate bars	15.25*
Cast iron brake shoes	15.25*
Stove plate	19.00*
Clean auto cast	20.00*
Cast iron carwheels	20.00*

CINCINNATI

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
No. 1 bundles	19.50*
No. 2 bundles	19.50*
Mach. shop turn.	$7.00 to 7.50
Shoveling turn.	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Mixed bor. & turn.	7.00 to 7.50
Low phos. plate	22.00*
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Stove plate	19.00*
Scrap rails	21.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	$15.05*
No. 2 hvy. melting	15.05*
No. 1 and 2 bundles	15.05*
Busheling	15.05*
Turnings, shovelings	$9.75 to 10.00
Machine shop turn.	6.00 to 6.50
Mixed bor. & turn.	6.00 to 6.50
Cl'n cast, chem. bor.	13.06 to 14.15*
Truck delivery to foundry	
Machinery cast	21.00 to 23.51*
Breakable cast	21.57 to 21.87*
Stove plate	20.00 to 23.51*

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	$17.32*
No. 2 hvy. melting	17.32*
No. 1 bundles	17.32*
New busheling	17.32*
Flashings	17.32*
Mach. shop turn.	$9.50 to 10.00
Short shov. turn.	11.50 to 12.25
Cast iron borings	10.50 to 11.00
Mixed bor. & turn.	9.50 to 10.00
Low phos. plate	19.00 to 19.82
No. 1 cupola cast	20.00*
Charging box cast	18.00 to 19.00
Hvy. breakable cast	16.50*
Stove plate	18.50 to 19.00
Automotive cast	20.00*

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	$18.75*
No. 2 hvy. melting	18.75*
No. 2 bundles	18.75*
Mach. shop turn.	$12.00 to 12.50
Shoveling turn.	13.50 to 14.00
Cast iron borings	13.50 to 14.00
Mixed bor. & turn.	12.00 to 12.50
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Cast, charging box	19.00*
Hvy. axle, forge turn.	17.50 to 18.00
Low phos. plate	21.25*
Low phos. punchings	21.25*
Billet crops	21.25*
RR. steel wheels	23.25*
RR. coil springs	23.25*
RR. malleable	22.00*

ST. LOUIS

Per gross ton delivered to consumer:

Heavy melting	$17.50*
Bundled sheets	17.50*
Mach. shop turn.	$9.00 to 9.50
Locomotive tires, uncut	17.00
Misc. std. sec. rails	19.00*
Rerolling rails	21.00*
Steel angle bars	21.00*
Rails 3 ft. and under	21.50*
RR. springs	22.00*
Steel car axles	23.50*
Stove plate	19.00*
Grate bars	15.25*
Brake shoes	15.25*
RR. malleable	22.00*
Cast iron carwheels	20.00*
No. 1 mach'ery cast	20.00*
Breakable cast	16.50*

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	$17.00*
No. 2 hvy. melting	17.00*
No. 2 bundles	17.00*
No. 1 busheling	17.00*
Long turnings	$9.50 to 10.00
Cast iron borings	9.50 to 10.00
Bar crops and plate	19.50*
Structural and plate	19.50*
No. 1 cast	20.00*
Stove plate	17.00
Steel axles	18.00*
Scrap rails	18.50
Rerolling rails	20.50*
Angles & splice bars	20.50*
Rails 3 ft. & under	21.00*
Cast iron carwheels	16.50 to 17.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	$20.00*
No. 2 hvy. melting	20.00*
Low phos. plate	22.50*
No. 1 busheling	20.00*
Hydraulic bundles	20.00*
Mach. shop turn.	$12.50 to 13.00
Short shovel. turn.	15.50 to 16.00
Cast iron borings	14.50 to 15.00

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.33*
No. 2 hvy. melting	15.33*
Comp. black bundles	15.33*
Comp. galv. bundles	13.33*
Mach. shop turn.	$8.50 to 9.00
Mixed bor. & turn.	8.50 to 9.00
Shoveling turn.	10.50
No. 1 cupola cast	20.00*
Hvy. breakable cast	16.50*
Charging box cast	19.00*
Stove plate	19.00*
Clean auto cast	20.00*
Unstrip. motor blks.	17.50*
Cl'n chem. cast bor.	14.33*

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.25*
No. 1 bundles	19.25*
No. 2 bundles	19.25*
No. 2 hvy. melting	19.25*
Mach. shop turn.	12.50
Shoveling turn.	15.50
Cast iron borings	13.50
Mixed bor. & turn.	12.50
No. 1 cupola cast	20.00*
Stove plate	19.00*
Low phos. plate	21.75*
Scrap rails	20.75*
Rails 3 ft. & under	22.75*
RR. steel wheels	23.75*
Cast iron car wheels	20.00*
RR. coil & leaf spgs.	23.75*
RR. knuckles & coup.	23.75*
RR. malleable	22.00*
No. 1 busheling	19.25*

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	$19.50*
No. 2 hvy. melting	19.50*
Compressed sheet stl.	19.50*
Drop forge flashings	19.00*
No. 2 bundles	19.50*
Mach. shop turn.	$11.50 to 12.00
Short shovel.	15.00 to 15.50
No. 1 busheling	19.50*
Steel axle turn.	19.00*
Low phos. billet and bloom crops	24.50*
Cast iron borings	14.00 to 14.50
Mixed bor. & turn.	12.50 to 13.00
No. 2 busheling	17.00*
No. 1 machine cast	20.00*
Railroad cast	20.00*
Railroad grate bars	15.25*
Stove plate	19.00*
RR. hvy. melting	20.50*
Rails 3 ft. & under	23.00*
Rails 18 in. & under	24.25*
Rails for rerolling	23.00*
Railroad malleable	22.00*
Elec. furnace punch	22.00*

SAN FRANCISCO

Per gross ton delivered to consumer:

RR. hvy. melting	$16.50
No. 1 hvy. melting	16.50
No. 2 hvy. melting	15.00
No. 2 bales	$13.50 to 14.25
No. 3 bales	9.50 to 10.59
Mach. shop turn.	7.00
Elec. furn. 1 ft., und.	15.50 to 17.00
No. 1 cupola cast	19.00 to 21.00

LOS ANGELES

Per gross ton delivered to consumer:

No. 1 hvy. melting	$14.50 to $15.50
No. 2 hvy. melting	13.50 to 14.50
No. 2 bales	12.50 to 13.50
No. 3 bales	9.00 to 10.00
Mach. shop turn.	4.50
No. 1 cupola cast	19.00 to 21.00

SEATTLE

Per gross ton delivered to consumer:

RR. hvy. melting	$14.50
No. 1 hvy. melting	14.50*
No. 3 bundles	11.50
Elec. furn. 1 ft., und.	17.00
No. 1 cupola cast	20.00*

Contact KAYDON *of Muskegon*

FOR ALL TYPES OF BALL AND ROLLER BEARINGS 4" BORE TO 120" OUTSIDE DIAMETER

The LVT-A2 "Water Buffalo" amphibious tank, a cargo-personnel carrier and offensive weapon used continuously since Guadalcanal in the Pacific theater.

LVT 4 "Water Buffalo" equipped with rear ramp. Brings supplies when no other vehicle can do so; carries wounded back to safety.

KAYDON spherical roller bearing, 4.3307" I. D. x 7.0866" O.D. x 2.2047" wide. KAYDON Bronze or steel retainers; super-precision or standard tolerances.

BUFFALO-*ing the* JAPS

WATER BUFFALOS . . . by Food Machinery Corporation, Riverside, California

BEARINGS . . . by KAYDON of Muskegon, Michigan

HEROES . . . by U. S. Army, Navy and Marines

☆ ☆ ☆

KAYDON Bearings serve the machines of the U. S. Armed Forces in many ways, on many fronts. KAYDON is proud of its part in speeding victory.

Specializing in the production of all types and sizes of ball and roller bearings in diameters up to 120", KAYDON offers a service that banishes the need for compromising on a "standard" bearing that does not fill your exact needs.

In addition, KAYDON offers atmospheric control in heat-treating, rarely provided by special bearing manufacturers; flame hardening, precision heat-treating, metallurgical laboratories, microscopy and physical testing.

Capacity available for production of all types and sizes of KAYDON Bearings.

KAYDON *Types of Standard or Special Bearings:*

Spherical Roller	Taper Roller
Ball Radial	Ball Thrust
Roller Radial	Roller Thrust

THE KAYDON ENGINEERING CORP.

MUSKEGON · MICHIGAN

New in Name . . . Old in Experience

Comparison of Prices . .

Advances Over Past Week in Heavy Type; Declines in *Italics*. Prices are F.O.B. Major Basing Points. The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 144-157.

Flat Rolled Steel (Cents Per Lb.)	July 10, 1945	July 3, 1945	June 5, 1945	July 11, 1944
Hot rolled sheets	2.20	2.20	2.20	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.70	3.70	3.70	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.25	2.25	2.25	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.25	2.25	2.25	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrought iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Bright wire	2.75	2.75	2.75	2.60
Wire nails	2.90	2.90	2.90	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$43.00	$43.00	$43.00	$40.00
Light rails	45.00	45.00	45.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$36.00	$36.00	$36.00	$34.00
Sheet bars	36.00	36.00	36.00	34.00
Slabs, rerolling	36.00	36.00	36.00	34.00
Forging billets	42.00	42.00	42.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.15	2.15	2.15	2.00
Skelp	1.90	1.90	1.90	1.90

Latest steel price increase, Amendment 13 to RPS6, effective May 23, 1945.

Pig Iron: (Per Gross Ton)	July 10, 1945	July 3, 1945	June 5, 1945	July 11, 1944
No. 2 fdy., Philadelphia	$26.84	$26.84	$26.84	$25.84
No. 2, Valley furnace	25.00	25.00	25.00	24.00
No. 2, Southern, Cin'ti	26:11	26.11	26.11	25.11
No. 2, Birmingham	21.38	21.38	21.38	20.38
No. 2, foundry, Chicago†	25.00	25.00	25.00	24.00
Basic, del'd eastern Pa.	26.34	26.34	26.34	25.34
Basic, Valley furnace	24.50	24.50	24.50	23.50
Malleable, Chicago†	25.00	25.00	25.00	24.00
Malleable, Valley	25.00	25.00	25.00	24.00
L. S. charcoal, Chicago*	42.34	42.34	42.34	37.34
Ferromanganese‡	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡ For carlots at seaboard.
Last pig iron price change authorized by OPA effective Feb. 14, 1945.
* Charcoal price increase retroactive to March 7, on contracts to Feb. 13.

Scrap: (Per Gross Ton)				
Heavy melt'g steel, P'gh.	$20.00	$20.00	$20.00	$26.00
Heavy melt'g steel, Phila.	18.75	18.75	18.00	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.32	17.32	17.32	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	22.50
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Chicago	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$7.50	$7.50	$7.50	$7.00
Foundry coke, prompt	9.00	9.00	9.00	8.25
Non-Ferrous Metals: (Cents Per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd.	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex.	14.50	14.50	14.50	14.50

Composite Prices . .

Starting with the issue of April 22, 1943, the weighted finished steel price index was revised for the years 1941, 1942 and 1943. See explanation of the change on page 90 of the April 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

	FINISHED STEEL	PIG IRON	SCRAP STEEL
July 10, 1945	2.41571c. a Lb.	$24.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.41571c. a Lb.	$24.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.41571c. a Lb.	$24.61 a Gross Ton	$18.92 a Gross Ton
One year ago	2.30837c. a Lb.	$23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1945	2.41571c., May 29	2.21189c., Jan. 2	$24.61, Feb. 20	$23.61, Jan. 2	$19.17	$19.17
1944	2.30837c., Sept. 5	2.21189c., Oct. 5	$23.61	$23.61	19.17	$15.67, Oct. 24
1943	2.25513c.	2.25513c.	23.61	23.61	19.17	19.17
1942	2.26190c.	2.26190c.	23.61	23.61	19.17	19.17
1941	2.43078c.	2.43078c.	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 8
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c. Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 8

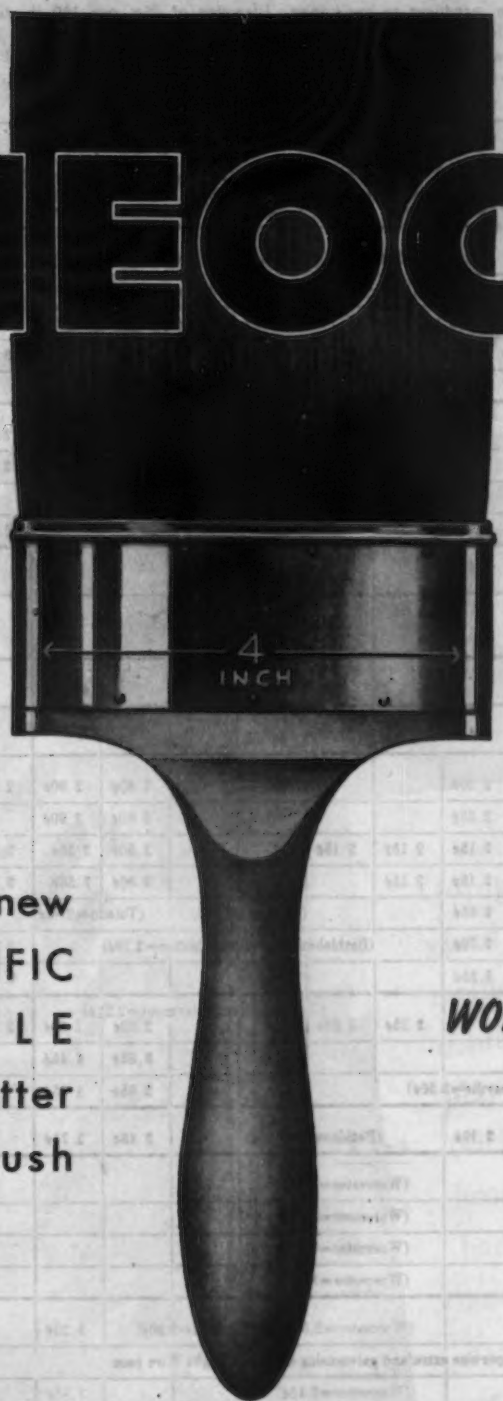
Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

All through the War Years—

NEOCETA* BRUSHES



have been available to the industries responsible for the production of the materials necessary for

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*. . the new SCIENTIFIC BRISTLE for a better Paint Brush

WORKS EASIER

SPREADS BETTER

HOLDS MORE

FINER FILM

LONG LIFE

The name **NEOCETA** is a registered Trade Mark of the Pittsburgh Plate Glass Co.

PITTSBURGH
PLATE GLASS COMPANY
Brush Division

PPG

4 YEARS ACTUAL USE

Send for the scientific facts in the booklet "The Fascinating Story of NEOCETA".

Prices of Finished Iron and Steel . . .

Steel prices shown here are f.o.b. basing points, in cents per lb. unless otherwise indicated. Extras apply. Delivered prices do not reflect 3% tax on freight. (1) Mill run sheet, 10c. per 100 lb. under base; primes, 25c. above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25c. per 100 lb. to fabricators. (8) Also shafting. For quantities of 20,000 to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. For price exceptions to finished and semi-finished steels turn two pages.

Basing Point / Product	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.20¢	2.30¢	2.20¢		2.75¢	2.30¢	2.44¢	2.37¢
Cold rolled [1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3 05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 gage)	3.70¢	3.70¢	3.70¢		3.70¢	3.70¢	3.70¢	3.70¢	3.80¢	3.70¢		4.25¢		3.94¢	3.87¢
Enameling (20 gage)	3.45¢	3.45¢	3.45¢	3.45¢			3.45¢		3.55¢	3 45¢		4.10¢	3.55¢	3.81¢	3.77¢
Long ternes [2]	3.80¢	3.80¢	3.80¢									4.55¢		4.16¢	4.12¢
STRIP															
Hot rolled [3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled [4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester=3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢	3.05¢		2.95¢			2.95¢	(Worcester=3.35¢)					3.05¢	3.31¢	
TIN PLATE															
Standard cokes, base box	$5.00	$5.00	$5.00						$5.10					5.36¢	5.32¢
Electro, box 0.25 lb.	$4.35	$4.35	$4.35												
Electro, box 0.50 lb.	$4.50	$4.50	$4.50						$4.60						
Electro, box 0.75 lb.	$4.65		$4.65						$4.75						
BLACK PLATE															
29 gage [5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[11]			3.37¢
TERNES, MFG.															
Special coated, base box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		(Duluth=2.35¢)			2.60¢	2.90¢	2.35¢	2.59¢	2.57¢
Rail steel [6]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢					2.60¢	2.90¢			
Reinforcing (billet) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.35¢	2.39¢	
Reinforcing (rail) [7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.35¢		2.47¢
Cold finished [8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit=2.70¢)			(Toledo=2.80¢)			2.99¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢		(Bethlehem, Massillon, Canton=2.70¢)					2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
PLATES								(Coatesville and Claymont=2.25¢)							
Carbon steel [13]	2.25¢	2.25¢	2.25¢	2.25¢	2.25¢		2.25¢	2.25¢			2.60¢	2.80¢	2.47¢	2.44¢	2.30¢
Floor plates	3.50¢	3.50¢									3.85¢	4.15¢		3.86¢	3.83¢
Alloy	3.50¢	3.50¢			(Coatesville=3.50¢)						3.95¢	4.15¢		3.70¢	3.69¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem=2.10¢)			2.45¢	2.75¢		3.27¢	3.215¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester=3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester=4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester=6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester=8.55¢)								
WIRE [9]															
Bright [12]	2.75¢	2.75¢		2.75¢	2.75¢		(Worcester=2.85¢)			(Duluth=2.80¢)		3.25¢			3.07¢
Galvanized	Add proper size extra and galvanizing extra to Bright Wire base														
Spring (High Carbon)	3.35¢	3.35¢		3.35¢			(Worcester=3.45¢)					3.85¢			3 67¢
PILING															
Steel Sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢

SEMI-FINISHED STEEL

Ingots, Carbon, Rerolling

Base per gross ton, f.o.b. mill.... $31.00

Ingots, Carbon, Forging

Base per gross ton, f.o.b. Birmingham, Buffalo, Chicago, Cleveland, Gary, Pittsburgh, Youngstown $36.00

Ingots, Alloy

Base per gross ton, f.o.b. Bethlehem, Buffalo, Canton, Coatesville, Chicago, Massillon, Pittsburgh $45.00

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.00 higher; delivered E. Michigan, $3 higher; f.o.b. Duluth, billets only, $2.00 higher; billets f.o.b. Pacific ports are $12 higher. Provo, $11.20 higher. Delivered prices do not reflect three per cent tax on freight rates.

	Per Gross Ton
Rerolling	$36.00
Forging quality	42.00

Alloy Billets, Blooms, Slabs

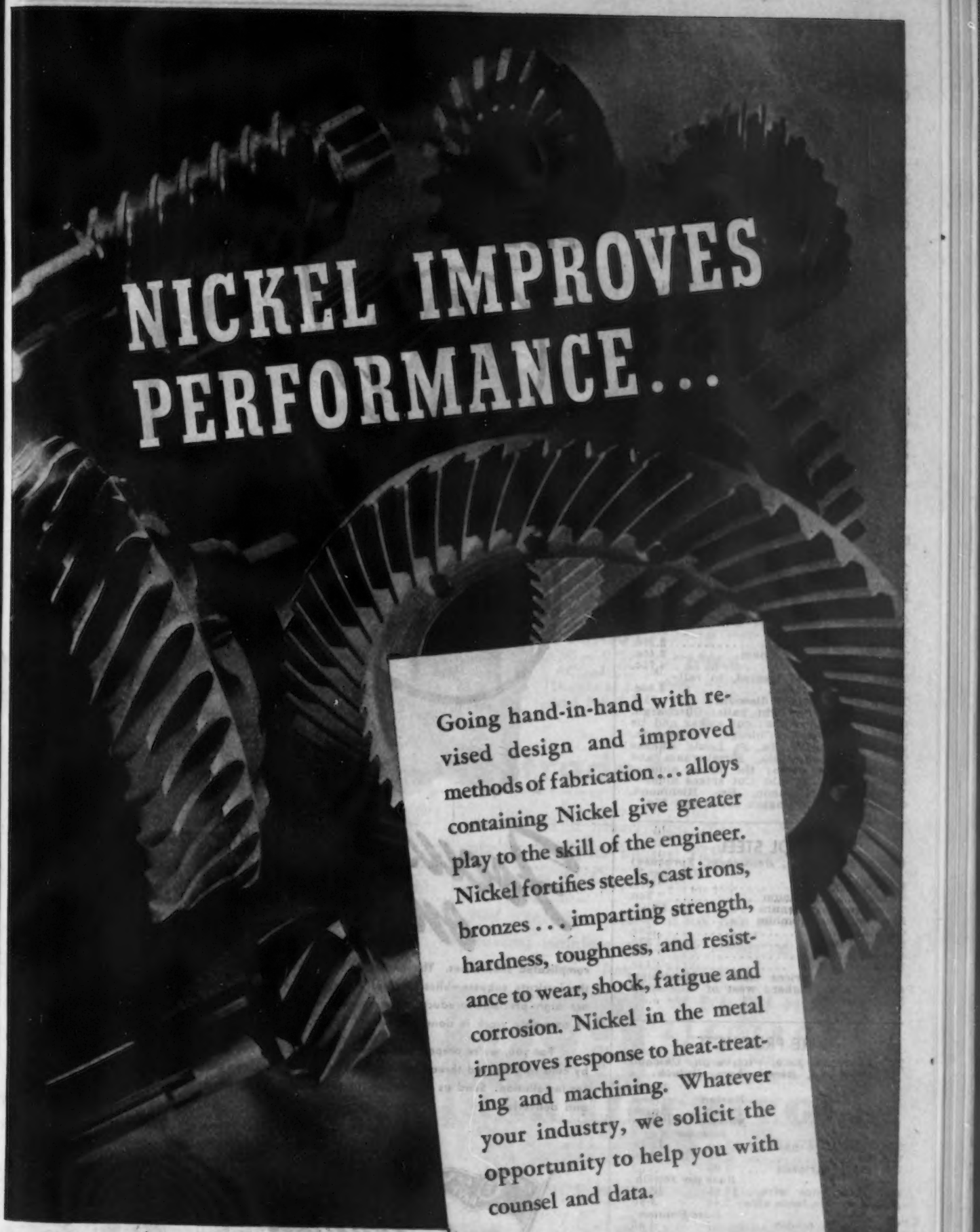
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem, per gross ton $54.00

Price delivered Detroit $2.00 higher; East Michigan, $3.00 higher.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point.

	Per Gross Ton
Open hearth or bessemer	$36.00


NICKEL IMPROVES
PERFORMANCE...
Going hand-in-hand with revised design and improved methods of fabrication... alloys containing Nickel give greater play to the skill of the engineer. Nickel fortifies steels, cast irons, bronzes . . . imparting strength, hardness, toughness, and resistance to wear, shock, fatigue and corrosion. Nickel in the metal improves response to heat-treating and machining. Whatever your industry, we solicit the opportunity to help you with counsel and data.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK 5, N.Y.

PRICES

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.15c.
Worcester, Mass.	2.25c.
Birmingham	2.15c.
San Francisco	2.65c.
Galveston	2.40c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham.

Prices delivered Detroit are $2.00 higher; East Michigan, $3 higher.

Price Exceptions: Follansbee Steel Corp. permitted to sell at $13.00 per gross ton, f.o.b. Toronto, Ohio, above base price of $52.00.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., No. 1 O.H., gross ton	$43.00
Angle splice bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$45.00
Light rails (from rail steel)	44.00
	Base per Lb.
Cut spikes	3.35c.
Screw spikes	5.40c.
Tie plate, steel	2.30c.
Tie plates, Pacific Coast	2.45c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c.
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25c.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi 3c. higher.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	*Pacific Coast Basing Points†*
	Base per Keg	
Standard wire nails	$2.90	$3.40
Coated nails	2.90	3.40
Cut nails, carloads	3.85	....
	Base per 100 Lb.	
Annealed fence wire	$3.05	$3.55
Annealed galv. fence wire	3.40	3.90
	Base Column	
Woven wire fence*	67	85
Fence posts, carloads	69	86
Single loop bale ties	66	91
Galvanized barbed wire**	72	82
Twisted barbless wire	72	....

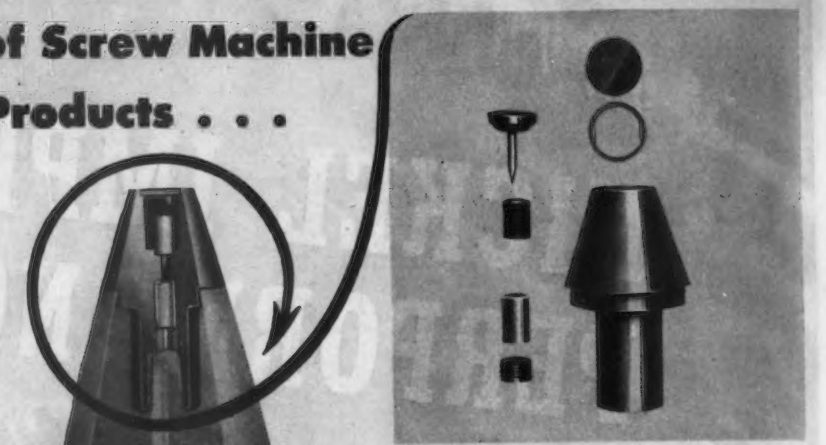
*15½ gage and heavier. **On 80-rod spools in carload quantities.

†Prices subject to switching or transportation charges.

For COMPLETE ASSEMBLIES . .

or SUBASSEMBLIES

of Screw Machine Products . . .



FUZE HEAD ASSEMBLY

FUZE BODY ASSEMBLY

Focus on FEDERAL SCREW!

Federal Screw Works has turned out *millions* of these complicated shell fuzes. The exploded views above show the parts needed for just two of the intricate subassemblies. Except for springs and stampings, all parts for the entire fuze are high-precision products of our screw machine and second-operation departments, and all assembly work is done at Federal Screw.

For you, we're prepared to make screw machine products of all types—to produce parts by cold forging and thread rolling—and to *assemble* these parts into *COMPLETE UNITS*, ready for installation. Send us the details of the products you need; we'll be glad to quote prices and deliveries.

Free illustrated book, "Focus on Federal Screw," shows at a glance our manufacturing facilities and many typical products. Write for a copy—on company letterhead, please.

ARMY (E) NAVY

CHELSEA DIVISION

Federal SCREW WORKS

DETROIT AND CHELSEA, MICHIGAN

MAIN OFFICES: 3401 Martin Ave., Detroit 10, Michigan

How much metal are *YOU* depositing in *YOUR* welds?

For better results in welding steel... choose the *RIGHT* electrode!

• That's the only sure way to get better results—lower costs. Give it some thought!

Important factors in improving your electrode efficiency are: (1) slag control during welding, (2) minimum arc blow, (3) easy striking of arc, and (4) elimination of crater cracking. But don't stop there. Consider also such points as good penetration, burn-off rate, smooth bead appearance, good X-ray properties, and rate of deposition in pounds per hour.

The electrode that gives you the best balance of these qualities—on your specific job—is the *right* electrode for you to use. If it's for welding steels, you'll find it among the P&H Electrodes shown above. Let your nearest P&H representative help you select it. Or write us.

P&H also manufactures a full line of electrodes for welding stainless and alloy steels, as well as for hard surfacing. Ask for literature.

P&H

WELDING ELECTRODES

4401 W. National Avenue
Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS • EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

A COMPLETE ARC WELDING SERVICE — FROM THIS ONE DEPENDABLE MANUFACTURER

DC Welders · AC Welders · Welding Electrodes · Welding Positioners · Welding Production Control Systems · Electric Hoists · Electric Cranes

WAREHOUSE PRICES

Delivered metropolitan areas per 100 lb. These are zoned warehouse prices in conformance with latest zoning amendment to OPA Price Schedule 49.

Cities	SHEETS			STRIP		Plates ¼ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot Rolled (10 gage)	Cold Rolled	Galvanized (24 gage)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled, NE 8617-20	Hot Rolled, NE 9442-45 Ann.	Cold Drawn, NE 8617-20	Cold Drawn, NE 9442-45 Ann.
**Philadelphia	$3.518	$4.872[6]	$4.768a	$3.922	$4.772	$3.605	$3.666	$3.822	$4.072	$5.818	$6.868	$7.072	$8.172
New York	3.59	4.813[3]	5.110	3.974[6]	4.772	3.768	3.758	3.853	4.103	5.858	6.908	7.103	8.203
Boston	3.744	4.744[9]	5.224[9]	4.106	4.715	3.912	3.912	4.044	4.144	6.012	7.062	7.194	8.394
Baltimore	3.394	4.852	4.894	3.902	4.752	3.594	3.759	3.802	4.052	....	....	....	....
Norfolk	3.771	4.965	5.371	4.165	4.865	3.971	4.002	4.065	4.165	....	....	....	....
Chicago	3.25	4.20	5.231	3.60	4.65[17]	3.55	3.55	3.50	3.75	5.60	6.65	6.65	7.90
Milwaukee	3.387	4.337[3]	5.272[4]	3.737	4.787[17]	3.687	3.687	3.637	3.887	5.837	6.887	6.887	7.987
Cleveland	3.35	4.40	4.877[4]	3.60	4.45	3.40	3.588	3.35	3.75	5.806	6.856	6.65	7.90
Buffalo	3.35	4.40	4.754	3.819	4.669	3.63	3.40	3.35	3.75	5.60	6.65	6.65	7.75
Detroit	3.45	4.50	5.004	3.70	4.859[17]	3.609	3.661	3.45	3.80	5.93	6.98	6.959	8.059
Cincinnati	3.425	4.475[3]	4.825[5]	3.675	4.711	3.661	3.691	3.611	4.011	5.95	7.00	7.011	8.261
St. Louis	3.397	4.347[3]	5.172[4]	3.747	4.931[17]	3.697	3.697	3.647	4.031	6.131	7.231	7.231	8.281
Pittsburgh	3.35	4.40	4.75	3.60	4.45	3.40	3.40	3.35	3.75	5.60	6.65	6.65	7.90
St. Paul	3.51	4.48	5.257[4]	3.86	4.35[17]	3.81[13]	3.81[13]	3.76[13]	4.361	6.09	7.19	7.581	8.711
Omaha	3.865	5.443	5.608[4]	4.215	....	4.165	4.165	4.115	4.443	....	....	....	....
Indianapolis	3.518	4.568	4.548	3.768	4.741	3.63	3.63	3.58	3.98	5.93	6.98	6.98	8.23
Birmingham	3.45	....	4.75	3.70	....	3.55	3.55	3.50	4.43	....	....	....	....
Memphis	3.965[7]	4.66	3.265	4.215	....	4.065	4.065	4.015	4.33	....	....	....	....
New Orleans	4.058*	4.95	5.358	4.308	....	4.158	4.158*	4.108*	4.629	....	....	....	....
Houston	3.763	5.573	6.313[1]	4.313	....	4.25	4.25	3.75	6.373[3]	7.223	8.323	8.323	9.373
Los Angeles	4.10	7.20[3]	6.10[4]	4.95	5.613[15]	4.95	4.65	4.40	5.583	8.304	9.404	9.404	10.454
San Francisco	4.55[14]	7.30[4]	6.35[4]	4.50[14]	7.333[17]	4.65[14]	4.35[14]	4.15[14]	5.333	8.304	9.404	9.404	10.454
Seattle	4.65[12]	7.05[4]	5.95[4]	4.25[12]	....	4.75[12]	4.45[12]	4.35[12]	5.783	....	9.404	....	....
Portland	4.65[11]	6.60[4]	5.75[4]	4.75[11]	....	4.85[11]	4.45[11]	4.45[11]	5.533	8.304	9.404	8.304	9.404
Salt Lake City	4.530[17]	....	6.171[3]	5.53[17]	....	4.98[17]	4.98[17]	4.88[17]	5.90	....	....	....	....

National Emergency Steels

MILL EXTRAS

Designation	Basic Open-Hearth		Electric Furnace		Designation	Basic Open-Hearth		Electric Furnace	
	Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs		Bars and Bar-Strip	Billets, Blooms, and Slabs	Bars and Bar-Strip	Billets, Blooms, and Slabs
NE 8612	0.65¢	$13.00	$1.15	$23.00	NE 9427	0.75¢	$15.00	$1.25	$25.00
NE 8615	0.65	13.00	1.15	23.00	NE 9430	0.75	15.00	1.25	25.00
NE 8617	0.65	13.00	1.15	23.00	NE 9432	0.75	15.00	1.25	25.00
NE 8620	0.65	13.00	1.15	23.00	NE 9435	0.75	15.00	1.25	25.00
NE 8622	0.65	13.00	1.15	23.00	NE 9437	0.75	15.00	1.25	25.00
NE 8625	0.65	13.00	1.15	23.00	NE 9440	0.75	15.00	1.25	25.00
NE 8627	0.65	13.00	1.15	23.00	NE 9442	0.80	16.00	1.30	26.00
NE 8630	0.65	13.00	1.15	23.00	NE 9445	0.80	16.00	1.30	26.00
NE 8632	0.65	13.00	1.15	23.00	NE 9447	0.80	16.00	1.30	26.00
NE 8635	0.65	13.00	1.15	23.00	NE 9450	0.80	16.00	1.30	26.00
NE 8637	0.65	13.00	1.15	23.00					
NE 8640	0.65	13.00	1.15	23.00					
NE 8642	0.65	13.00	1.15	23.00	NE 9722	0.65	13.00	1.15	23.00
NE 8645	0.65	13.00	1.15	23.00	NE 9727	0.65	13.00	1.15	23.00
NE 8647	0.65	13.00	1.15	23.00	NE 9732	0.65	13.00	1.15	23.00
NE 8650	0.65	13.00	1.15	23.00	NE 9737	0.65	13.00	1.15	23.00
					NE 9742	0.65	13.00	1.15	23.00
					NE 9745	0.65	13.00	1.15	23.00
NE 8712	0.70	14.00	1.20	24.00	NE 9747	0.65	13.00	1.15	23.00
NE 8715	0.70	14.00	1.20	24.00	NE 9750	0.65	13.00	1.15	23.00
NE 8717	0.70	14.00	1.20	24.00	NE 9763	0.65	13.00	1.15	23.00
NE 8720	0.70	14.00	1.20	24.00	NE 9768	0.65	13.00	1.15	23.00
NE 8722	0.70	14.00	1.20	24.00					
NE 8725	0.70	14.00	1.20	24.00					
NE 8727	0.70	14.00	1.20	24.00	NE 9830	1.30	26.00	1.80	36.00
NE 8730	0.70	14.00	1.20	24.00	NE 9832	1.30	26.00	1.80	36.00
NE 8732	0.70	14.00	1.20	24.00	NE 9836	1.30	26.00	1.80	36.00
NE 8735	0.70	14.00	1.20	24.00	NE 9837	1.30	26.00	1.80	36.00
NE 8737	0.70	14.00	1.20	24.00	NE 9840	1.30	26.00	1.80	36.00
NE 8740	0.70	14.00	1.20	24.00	NE 9842	1.30	26.00	1.80	36.00
NE 8742	0.70	14.00	1.20	24.00	NE 9845	1.30	26.00	1.80	36.00
NE 8745	0.70	14.00	1.20	24.00	NE 9847	1.30	26.00	1.80	36.00
NE 8747	0.70	14.00	1.20	24.00	NE 9850	1.30	26.00	1.80	36.00
NE 8750	0.70	14.00	1.20	24.00					
					NE 9912	1.20	24.00	1.55	31.00
NE 9415	0.75	15.00	1.25	25.00	NE 9915	1.20	24.00	1.55	31.00
NE 9417	0.75	15.00	1.25	25.00	NE 9917	1.20	24.00	1.55	31.00
NE 9420	0.75	15.00	1.25	25.00	NE 9920	1.20	24.00	1.55	31.00
NE 9422	0.75	15.00	1.25	25.00	NE 9922	1.20	24.00	1.55	31.00
NE 9425	0.75	15.00	1.25	25.00	NE 9925	1.20	24.00	1.65	31.00

Note 1: The ranges shown are restricted to sizes 100 sq. in. or less or equivalent cross-sectional area 18 in. wide or under with a maximum individual piece weight of 7000 lb. irrespective of size. Note 2: For steels ordered to such ranges, below the size and weight restriction, the average of all the chemical checks must be within the limits specified subject to check analysis variations given in Table 4, Section 10, AISI Steel Products Manual. Note 3: When acid open-hearth is specified and acceptable, add to basic open-hearth alloy differential 0.25c. per lb. for bars and bar strip and $5 per gross ton for billets, blooms and slabs. Note 4: The extras shown are in addition to the base price of $2.70 for 100 lb. on finished products and $54 per gross ton on semi-finished steel, major basing points, and are in cents per pound when applicable to bars and bar-strip and in dollars per gross ton when applicable to billets, blooms and slabs. The full extra applicable over the base price is the total of all extras indicated by the specific requirements of the order. The higher extra shall be charged for any size falling between two published extras.

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD ROLLED: Sheets, 400 to 1499 lb.; strip, extras on all quantities; bars, 1500 lb. base.

NE ALLOY BARS: 1000 to 39,999 lb.

EXCEPTIONS: (1) 150 to 499 lb. (2) 150 to 1499 lb. (3) 400 to 1499 lb. (4) 450 to 1499 lb. (5) 500 to 1499 lb. (6) 0 to 199 lb. (7) 400 to 1499 lb. (8) 1000 to 1999 lb. (9) 450 to 3749 lb. (10) 400 to 3999 lb. (11) 300 to 4999 lb. (12) 300 to 10,000 lb. (13) 400 to 14,999 lb. (14) 400 lb. and over. (15) 1000 lb. and over. (16) 1500 lb. and over. (17) 2000 lb. and over. (18) 3500 lb. and over.

(a) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

*Add 0.271c. for sizes not rolled in Birmingham.

**City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

LAKE SUPERIOR ORES

(51.50% *Fe, Natural Content, Delivered Lower Lake Ports**)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorus, 51.50	4.35

*Adjustments are made to indicate prices based on variance of Fe content of ores as analyzed on a dry basis by independent laboratories.

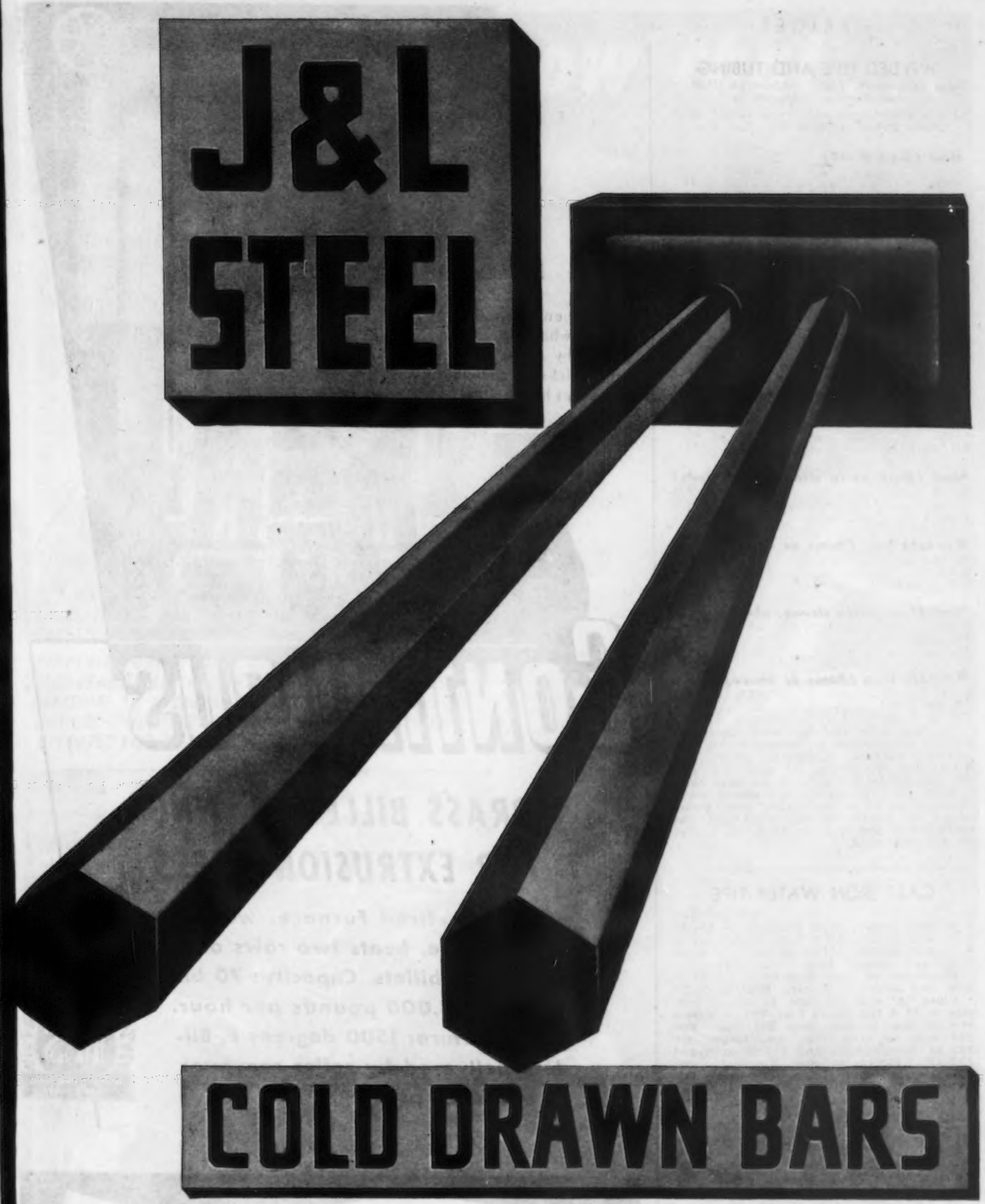
FLUORSPAR

Maximum price f.o.b. consumer's plant, $30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

Exception

When the WPB Steel Division certifies in writing the consumer's need for one of the higher grades of metallurgical fluorspar specified in the table below the price shall be taken from the table plus items (1 and 2) from paragraph above.

Effective CaF_2 Content:	*Base price per short ton*
70% or more	$33.00
65% but less than 70%	32.00
60% but less than 65%	31.00
Less than 60%	30.00



Precision, smooth finish, uniformity are the prime qualities you insist on in cold drawn steel bars. Our metallurgical engineers will be glad to discuss your production problems with you.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PENNSYLVANIA

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200.00 per Net Ton

	Black	Galv.
Steel (Butt Weld)		
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½
Wrought Iron (Butt Weld)		
½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18
Steel (Lap Weld)		
2 in.	61	49½
2½ in. and 3 in.	64	52½
3½ to 6 in.	66	54½
Wrought Iron (Lap Weld)		
2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17
Steel (Butt, extra strong, plain ends)		
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57
Wrought Iron (Same as Above)		
½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½
Steel (Lap, extra strong, plain ends)		
2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56
Wrought Iron (Same as Above)		
2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger are $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

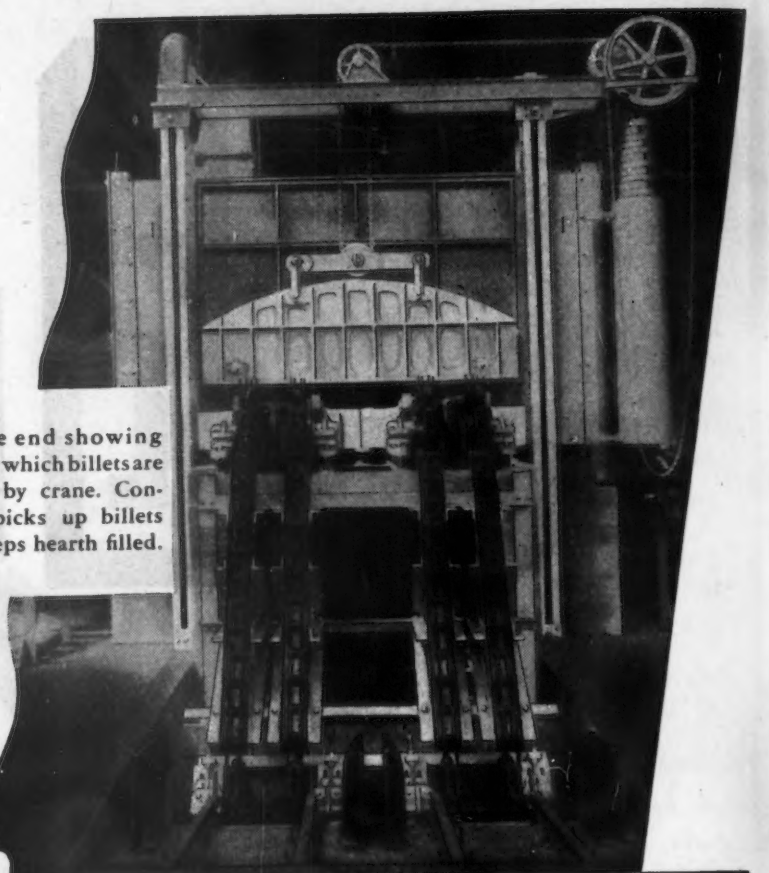
BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes, Minimum Wall. Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots.

	Seamless Cold Drawn	*Hot Rolled*	*Lap Weld, Hot Rolled*
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. and over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. or 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%



Charge end showing pit into which billets are placed by crane. Conveyor picks up billets and keeps hearth filled.

CONTINUOUS

BRASS BILLET HEATING FOR EXTRUSION PRESS

R-S gas-fired Furnace, walking beam type, heats two rows of 8" diameter billets. Capacity: 70 billets or 28,000 pounds per hour. Temperature: 1500 degrees F. Billets delivered by roller conveyor to extrusion press.

R-S QUALITY PRODUCTS SINCE 1903

R-S Furnaces of Distinction

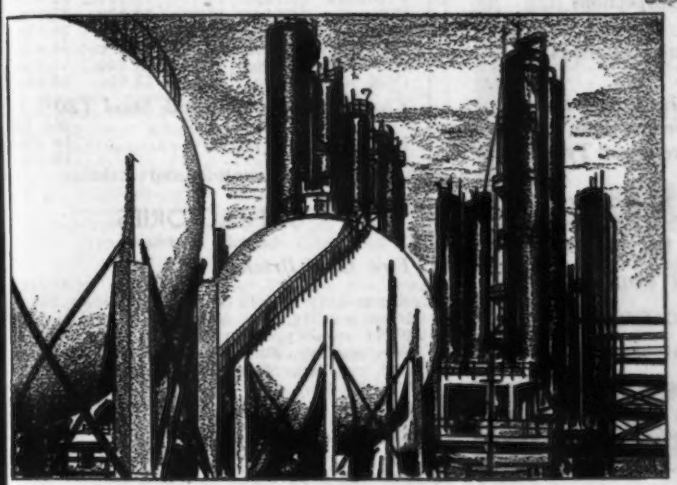
FURNACE DIVISION
R-S PRODUCTS CORPORATION

4524 Germantown Avenue • Philadelphia 44, Penna.

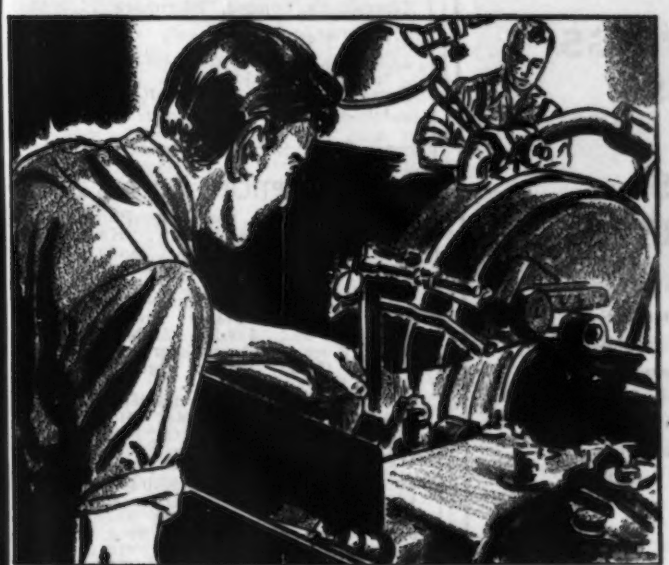
BUY WAR BONDS

Do you know that . . .

A TANK CAR TRAIN STRETCHING FROM WASHINGTON TO QUEBEC WOULD BE REQUIRED TO CONTAIN A SINGLE YEAR'S PRODUCTION OF CRUDE OIL FROM SINCLAIR'S 8000 WELLS.



SINCLAIR RUBBER INC., A SINCLAIR SUBSIDIARY, MANUFACTURED IN ONE YEAR SUFFICIENT BASIC MATERIAL TO PRODUCE 78,000 TONS OF SYNTHETIC RUBBER. THIS PLANT AT HOUSTON, TEX., IS SINCLAIR OPERATED FOR THE GOVERNMENT.



FOR FASTER MACHINING, FINER FINISH, AND LOWEST COST PER UNIT MACHINED SINCLAIR PROVIDES DIVERSIFIED CUTTING OILS SUITED TO ALL TYPES OF METALS . . . ALSO SPECIALIZED LUBRICANTS FOR BETTER MAINTENANCE OF EQUIPMENT.

SINCLAIR IS EQUIPPED TO SERVE YOU BETTER!

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY, 630 FIFTH AVENUE, NEW YORK 20, N. Y.

"HERCULES" RED-STRAND WIRE ROPE

You Can Depend On "Hercules" (Red Strand) Wire Rope

Highlights of Quality

1. Acid Open-Hearth Steel Wire
2. Rigid Tests and Inspections
3. Correct Manufacturing Methods
4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

• • Results are what count, and the performance record of this wire rope continues to make and hold friends.

There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK • • • 90 West Street
CHICAGO • • 810 W. Washington Blvd.
DENVER • • • 1554 Wazee Street
SAN FRANCISCO • • 320 Fourth Street
PORTLAND • • 914 N. W. 14th Avenue
SEATTLE • • 3410 First Avenue South

MACHINED BRONZE BEARINGS
GRAPHITED AND OILLESS BRONZE BEARINGS
BRONZE GEAR BLANKS
MACHINED BRONZE PARTS

S & H Bronze Bearings are made of cast bronze, under the most modern conditions and of specifications to meet the most exacting requirements. We are manufacturers of plain bronze and graphited and oilless bronze bearings for all branches of the Government Services, as well as plain cylinder type, single and double flange, thrust washers, from ⅜" in diameter to 20" in diameter. We also manufacture special parts made of cast bronze. Our manufacturing methods and equipment enable us to meet the most exacting machining specifications.

If it's Bronze — BETTER BEARINGS — *We make it*

INDUSTRIAL BEARINGS

S. & H. Bearing and Manufacturing Co.

340-344 North Avenue, East

Cranford New Jersey

PRICES

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hot strip	17.00c.	17.50c.	24.00c.	35.00c.
Cold strip	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$68.55
First quality, Pa., Md., Ky., Mo., Ill.	54.45
First quality, New Jersey	59.45
Sec. quality, Pa., Md. Ky., Mo., Ill.	49.40
Sec. quality, New Jersey	54.15
No. 1 Ohio	45.75
Ground fire clay, net ton	8.05

Silica Brick

Pennsylvania and Birmingham	$54.45
Chicago District	62.45
Silica cement, net ton (Eastern)	9.55

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester	$54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$43.48
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

EXCEPTIONS TO RPS 6

Ingots, carbon, rerolling—Phoenix Iron Co. may charge $38.75; Kaiser Co., $43.00 f.o.b. Pacific Coast ports; Empire Sheet & Tinplate Co., $34.25; Pgh. Steel Co., $33.10. Granite City Steel, $39.45.

Ingots, carbon, forging—Phoenix Iron Co. may charge $43.00; Empire Sheet & Tinplate Co., $39.25, f.o.b. Mansfield, Ohio; West Coast producers, $48.00, f.o.b. Pacific Coast Ports; Pgh. Steel Co., $38.10.

Ingots, alloy—C/l delivered Detroit add $2.00; delivered East Michigan add $3.00. Connors Steel Co. may charge $45.00 f.o.b. Birmingham.

Slabs, per gross ton—Andrews Steel Co. $41 basing pts.; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth, Ohio; Empire Sheet & Tin Plate Corp. $41; Phoenix Iron Co. (rerolling) $41, (forging) $47; Granite City Steel $47.50; Kaiser Co., (rerolling) $58.64, (forging) $64.64, f.o.b. Los Angeles.

Blooms, per gross ton—Phoenix Iron Co. (rerolling) $41; (forging) $47; Pgh. Steel Co. (rerolling) $38.25, (forging) $44.25; Wheeling Steel Corp. (rerolling) 4 in. sq. or larger $37.75 f.o.b. Portsmouth; Kaiser Co. (rerolling) $58.64, (forging) $64.64 (shell steel) $74.64 f.o.b. Los Angeles.

Sheet Bar, per gross ton—Empire Sheet & Tinplate Co. $39 mill; Wheeling Steel Corp. $38 Portsmouth, Ohio.

Billets, Forging, per gross ton—Andrews Steel Co. $50 basing pts.; Follansbee Steel Corp. $49.50 Toronto, Ohio; Phoenix Iron Co. $47 mill; Geneva Steel Co. $64.64 f.o.b. Pacific Coast; Pittsburgh Steel Co. $49.50; Kaiser Co. $64.64, (shell steel) $74.64, f.o.b. Los Angeles.

PRICES

Billets, Rerolling, per gross ton—Continental Steel Corp. may charge Acme Steel in Chicago switching area $34 plus freight from Kokomo, Ind.; Northwestern Steel & Wire Co. (Lend-Lease) $41 mill; Wheeling Steel Corp. 4 in. sq. or larger $37.75, smaller $39.50 f.o.b. Portsmouth, Ohio; Stanley Works may sell Washburn Wire Co. under allocation at $39 Bridgeport, Conn.; Keystone Steel & Wire Co. may sell Acme Steel Co. at Chicago base, f.o.b. Peoria; Phoenix Iron Co. $41 mill; Continental Steel Corp. (1¾ x 1¾) $39.50, (2 x 2) $40.60 Kokomo, Ind. (these prices include $1 size extra); Keystone Steel & Wire Co. $36.40 Peoria; Connors Steel Co. $50.60 Birmingham; Ford Motor Co. $34 Dearborn, Mich.; Geneva Steel Co. $58.64 f.o.b. Pacific Coast; Pgh. Steel Co. $43.50; Kaiser Co. $58.64 f.o.b. Los Angeles.

Structural Shapes—Phoenix Iron Co. 2.35c. basing pts. (export) 2.50c. Phoenixville; Knoxville Iron Co. 2.30c. basing points; Kaiser Co. 3.20c. f.o.b. Los Angeles.

Rails, per gross ton—Sweet Steel Co. (rail steel) $50 mill; West Virginia Rail Co. (lightweight) on allocation based Huntington, W. Va.; Colorado Fuel & Iron, $45 Pueblo.

Hot Rolled Plate—Granite City Steel Co. 2.85c. mill; Knoxville Iron Co. 2.25c. basing pts.; Kaiser Co. and Geneva Steel Co. 3.20c. Pacific Ports; Central Iron and Steel Co. 2.50c. basing points; Granite City Steel Co. 2.35c. Granite City.

Merchant Bars—W. Ames Co., 10 tons and over, 2.85c. mill; Eckels-Nye Steel Corp. 2.50c. basing pts. (rail steel) 2.40c.; Phoenix Iron Co. 2.40c. basing pts.; Sweet Steel Co. (rail steel) 2.33c. mill; Joslyn Mfg. & Supply Co., 2.35c. Chicago; Calumet Steel Div., Borg Warner Corp. (8 in. mill bar), 2.35c. Chicago; Knoxville Iron Co., 2.30c. basing pts.; Laclede Steel Co., sales to LaSalle Steel granted Chicago base, f.ob Madison, Ill.; Milton Mfg. Co., 2.75c. f.o.b. Milton, Pa.

Pipe Skelp—Wheeling Steel, Benwood, 2.05c.

Reinforcing Bars—W. Ames & Co., 10 tons and over, 2.85c. mill; Sweet Steel Co. (rail steel), 2.33c. mill; Columbia Steel Co., 2.50c. Pacific Ports.

Cold Finished Bars—Keystone Drawn Steel Co. on allocation, Pittsburgh c.f. base plus c/l freight on hot rolled bars Pittsburgh to Spring City, Pa.; New England Drawn Steel Co. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to Mansfield, Mass., f.o.b. Mansfield; Empire Finished Steel Corp. on allocation outside New England, Buffalo c.f. base plus c/l freight Buffalo to plants, f.o.b. plant; Compressed Steel Shafting Co. on allocation outside New England, Buffalo base plus c/l freight Buffalo to Readville, Mass., f.o.b. Readville; Medart Co. in certain areas, Chicago c.f. base plus c/l freight Chicago to St. Louis, f.o.b. St. Louis.

Alloy Bars—Texas Steel Co., for delivery except Texas and Okla., Chicago base, f.o.b. Fort Worth, Tex.; Connors Steel Co., shipped outside Ala., Mississippi, Louisiana, Georgia, Florida, Tenn., Pittsburgh base, f.o.b. Birmingham.

Hot Rolled Strip—Joslyn Mfg. & Supply Co., 2.30c. Chicago; Knoxville Iron Co., 2.25c. basing pts.

Hot Rolled Sheets—Andrews Steel Co., Middletown base on shipments to Detroit or area; Parkersburg Iron & Steel, 2.25c. Parkersburg. Granite City Steel 2.43c.

Galvanized Sheets—Andrews Steel Co. 3.75c. basing pts.; Parkersburg Iron & Steel Co., 3.85c. Parkersburg; Continental Steel Co., Middletown base on Kokomo, Ind., product; Superior Sheet Steel Co., Pittsburgh base except for Lend-Lease.

Pipe and Tubing—South Chester Tube Co. when priced at Pittsburgh, freight to Gulf Coast and Pacific Ports may be charged from Chester, Pa., also to points lying west of Harrisburg, Pa.

Black Sheets—Empire Sheet and Tinplate Co., maximum base price mill is 2.45c. per 100 lb., with differentials, transportation charges, etc., provided in RPS. No. 6.

Wire Products—Pittsburgh Steel Co., f.o.b. Pittsburgh, per 100 lb., rods, No. 5 to 9/32 in., 2.20c.; rods, heavier than 9/32, 2.35c.; bright wire, 2.725c.; bright nails, 2.90c.; lead and furnace annealed wire, 2.85c.; pot annealed wire, 2.85c.; galvanized barbed wire, 3.90c.; plain staples, 2.55c.; galvanized staples, 2.65c.; bright spring wire, 3.30c.; galvanized spring wire, 3.45c.

OHIO SHEARS

SOLID STEEL—*all grades*

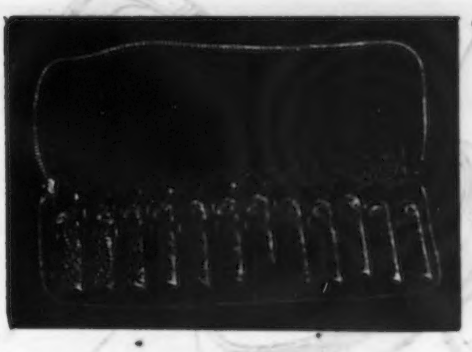
LAID STEEL—*hi-speed and carbon*

ROTARY SHEARS *and* SLITTERS

The OHIO KNIFE *Co.*

CINCINNATI 23, OHIO

HEAT-TREATED STEEL SHOT



We manufacture shot and grit for endurance

Heat-Treated Steel Shot and Heat-Treated Steel Grit

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

Manchester, New Hampshire

HEAT-TREATED STEEL GRIT

BASING POINT* BASE PRICES

Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem	$25.50	$26.00	$26.50	$27.00	.....
Birdsboro	25.50	26.00	26.50	27.00	$30.50
Birmingham	20.00	21.38	.....	26.00	.....
Buffalo	24.00	25.00	25.50	26.00	30.50
Chicago	24.50	25.00	25.00	25.50	.....
Cleveland	24.50	25.00	25.00	25.50	.....
Detroit	24.50	25.00	25.00	25.50	.....
Duluth	25.00	25.50	25.50	26.00	.....
Erie	24.50	25.00	25.50	26.00	.....
Everett	25.50	26.00	26.50	27.00	.....
Granite City	24.50	25.00	25.00	25.50	.....
Hamilton	24.50	25.00	25.00	.....	.....
Neville Island	24.50	25.00	25.00	25.50	.....
Provo	22.50	23.00	.....	.....	.....
Sharpsville [1]	24.50	25.00	25.00	25.50	.....
Sparrows Point	25.50	26.00	.....	.....	.....
Steelton	25.50	.....	.....	.....	30.50
Swedeland	25.50	26.00	26.50	27.00	.....
Toledo	24.50	25.00	25.00	25.50	.....
Youngstown	24.50	25.00	25.00	25.50	.....

DELIVERED PRICES† (BASE GRADES)

Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Boston	Everett	$ .50	$26.00	$26.50	$27.00	$27.50	.....
Boston	Birdsboro-Steelton	4.02	.....	.....	.....	.....	$34.52
Brooklyn	Bethlehem	2.50	28.00	28.50	29.00	29.50	.....
Brooklyn	Birdsboro	2.92	.....	.....	.....	.....	33.42
Canton	Cleveland	1.39	25.89	26.39	26.39	26.89	.....
Canton	Buffalo	3.19	.....	.....	.....	.....	33.69
Cincinnati	Birmingham	4.06	24.06	25.44	.....	.....	.....
Cincinnati	Hamilton	1.11	.....	.....	26.11	.....	.....
Cincinnati	Buffalo	4.40	.....	.....	.....	.....	34.90
Jersey City	Bethlehem	1.53	27.03	27.53	28.03	28.53	.....
Jersey City	Birdsboro	1.94	.....	.....	.....	.....	32.44
Los Angeles	Provo	4.95	27.45	27.95	.....	.....	.....
Los Angeles	Buffalo	15.41	.....	.....	.....	.....	46.91
Mansfield	Cleveland & Toledo	1.94	26.44	26.94	26.94	27.44	.....
Mansfield	Buffalo	3.36	.....	.....	.....	.....	33.86
Philadelphia	Swedeland	.84	26.34	26.84	27.34	27.84	.....
Philadelphia	Birdsboro	1.24	.....	.....	.....	.....	31.74
San Francisco	Provo	4.95	27.45	27.95	.....	.....	.....
San Francisco	Buffalo	15.41	.....	.....	.....	.....	46.91
Seattle	Provo	4.95	27.45	27.95	.....	.....	.....
Seattle	Buffalo	15.41	.....	.....	.....	.....	46.91
St. Louis	Granite City	.50	25.00	25.50	25.50	26.00	.....
St. Louis	Buffalo	7.07	.....	.....	.....	.....	37.57

* Maximum per gross ton, established by OPA February 14, 1945. † Prices do not reflect 3 per cent tax on freight.

(1) Struthers Iron & Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, $33.00 and $34.00, respectively. Newberry Brand of Lake Superior charcoal iron $39.00 per g.t., f.o.b. furnace, by order L 39 to RPS 10, April 11, 1945, retroactive to March 7, 1945. Delivered to Chicago, $42.34. High phosphorus iron sells at Lyles, Tenn., at $28.50.

Basing point prices are subject to switching charges; Silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 to 2.25 per cent); Phosphorus differentials, a reduction of 38c. per ton for phosphorus content of 0.70 per cent and over; Manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.5 to 0.75 per cent nickel content and $1 per ton extra for each additional 0.25 per cent nickel.

Silvery iron and bessemer ferrosilicon up to and including 14.00 per cent silicon covered by RPS 10 as amended Feb. 14, 1945. Silvery iron, silicon 6.00 to 6.50 per cent, C/L per G.T., f.o.b. Jackon, Ohio—$30.50; f.o.b. Buffalo—$31.75. Add $1.00 per ton for each additional 0.50% Si. Add 50c. per ton for each 0.50% Mn over 1.00%. Add $1.00 per ton for 0.75% or more P. Bessemer ferrosilicon prices are $1.00 per ton above silvery iron prices of comparable analysis.

METAL POWDERS

Prices are based on current market prices of ingots plus a fixed figure. F.o.b. shipping point, c. per lb., ton lots.

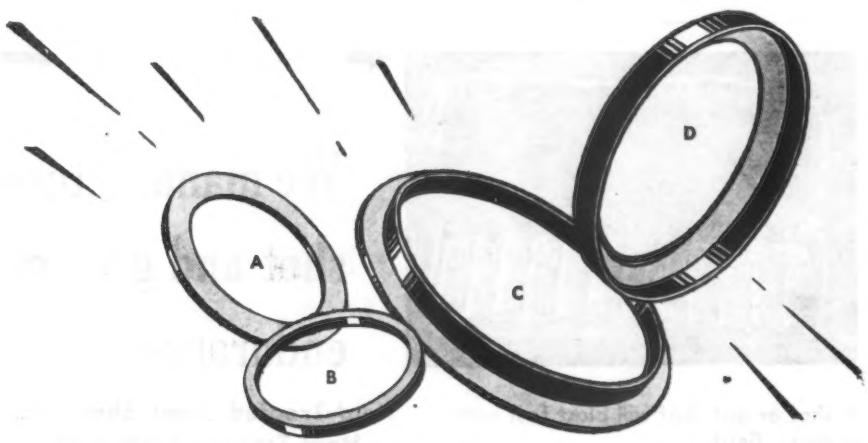
Copper, electrolytic, 150 and 200 mesh	21½ to 23½c.
Copper, reduced, 150 and 200 mesh	20½ to 25½c.
Iron, commercial, 100 and 200 mesh 96 + % Fe	12½ to 15c.
Iron, crushed, 200 mesh and finer, 90 + % Fe, carload lots	4c.
Iron, hydrogen reduced, 300 mesh and finer, 98½ + % Fe, drum lots	63c.
Iron, electrolytic, unannealed, 300 mesh and coarser, 99 + % Fe	30 to 33c.
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe	42c.
Iron, carbonyl, 300 mesh and finer, 98-99.8 + % Fe	90c.
Aluminum, 100 and 200 mesh	*23 to 27c.
Antimony, 100 mesh	30.6c.
Cadmium, 100 mesh	$1
Chromium, 150 mesh	$1.03
Lead, 100, 200 & 300 mesh	11½ to 12½c.
Manganese, 150 mesh	51c.
Nickel, 150 mesh	51½c.
Solder powder, 100 mesh	8½c. plus metal
Tin, 100 mesh	58¾c.
Tungsten metal powder, 98%-99%, any quantity, per lb.	$2.60
Molybdenum powder, 99%, in 200-lb. kegs, f.o.b. York, Pa., per lb.	$2.60
Under 100 lb.	$3.00

*Freight allowed east of Mississippi.

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$7.50*
Foundry, beehive (f.o.b. oven)	
Fayette Co., W. Va.	8.10
Connellsville, Pa.	9.00
Foundry, By-Product	
Chicago, del'd	13.35
Chicago, f.o.b.	12.60
New England, del'd	14.25
Kearny, N. J., f.o.b.	12.65
Philadelphia, del'd	12.85
Buffalo, del'd	13.00
Portsmouth, Ohio, f.o.b.	11.10
Painesville, Ohio, f.o.b.	11.75
Erie, del'd	12.75
Cleveland, del'd	12.80
Cincinnati, del'd	12.85
St. Louis, del'd	13.85
Birmingham, del'd	10.60

*Hand drawn ovens using trucked coal permitted to charge $8.00 per ton plus transportation charges.



For nearly forty years—through peace and war times—King has supplied metal rings and flanges to industry. And throughout that period, the name "King" has been synonymous with highest quality materials, craftsmanship, dependability. Rolled hot or cold from bar stock steel or non-ferrous metals, King Rings and Flanges are true to size, perfectly welded, smooth-finished.

Variety and versatility are seldom found in the equipment of a maker of rings and flanges. But these attributes characterize the King organization. Unusual dimensions, peculiar shapes, the ability to work with company engineers along unprecedented lines—these are qualities you will find at King.

A Flat Flange
B Band Ring
C Leg-out Angle Ring
D Leg-in Angle Ring

KING FIFTH WHEEL COMPANY

2917 N. SECOND STREET, PHILADELPHIA 33, PA.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

Base discount less case lots

	Per Cent Off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all lengths	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

⅛ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
Base discount less keg lots		
7/16 in. and smaller	..	64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 in. through 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full keg lots, 10 per cent additional discount.

Stove Bolts	*Consumer*
Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	$3.75

Small Rivets

(7/16 in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5

Cap and Set Screws	*Consumer Per Cent Off List*
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

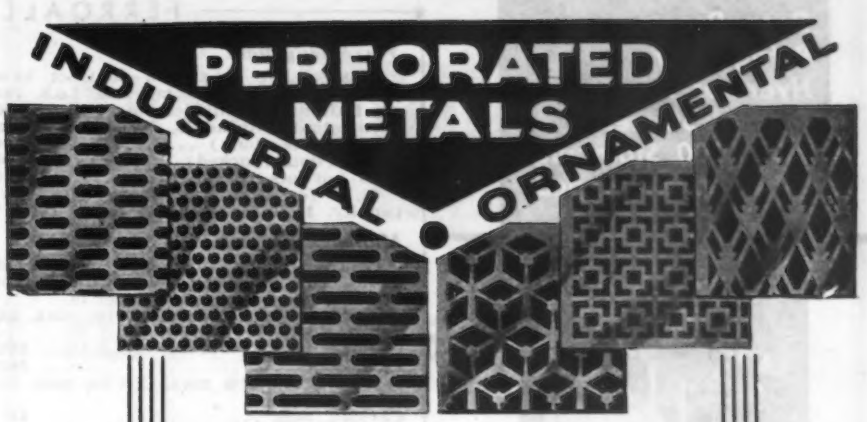
	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.30c.
Armature	3.65c.
Electrical	4.15c.
Motor	5.05c.
Dynamo	5.75c.
Transformer 72	6.25c.
Transformer 65	7.25c.
Transformer 58	7.75c.
Transformer 52	8.55c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.



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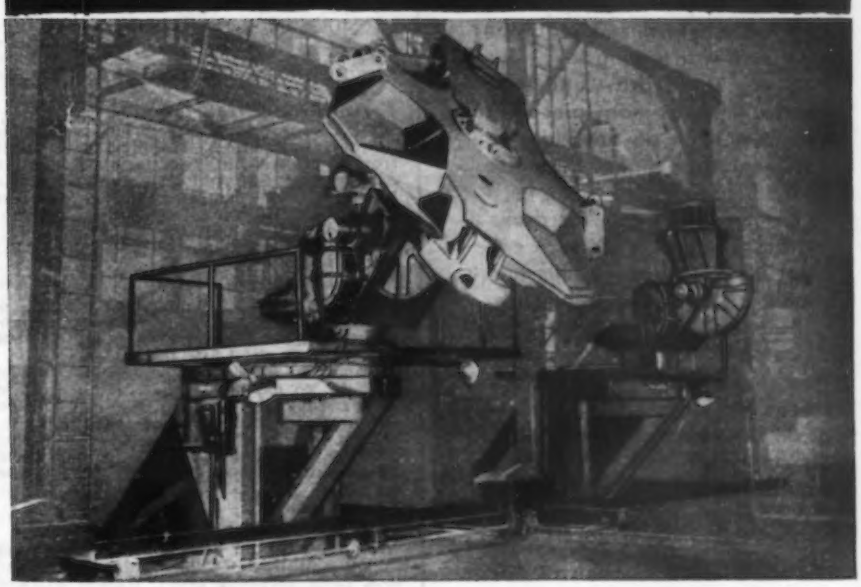
Industrial—Well balanced screens of excellent material and workmanship to assure maximum screen production combined with durability.

Ornamental—Approved patterns and finishes including many exclusive and characteristic designs for grilles and furniture. We invite your inquiries.

The Harrington & King Perforating Co.

5657 FILLMORE STREET—CHICAGO 44, ILL.
Eastern Office, 114 Liberty Street, New York 6, N. Y.

C-F POSITIONERS



Production Set-up Like This Forecasts A New "Shop Practice"

By *welding* on C-F Positioners, some manufacturers far out-produced all estimates of "possible" "War Production." Not only did this method increase out-put, it saved material and increased strength and quality while lowering the cost per unit. Under post-war competition automatic welding on C-F Positioners is certain to become standard manufacturing practice for many products. It is a new method that permits down-hand welding of all sides and angles from a single set-up. A method you should know and understand.

Write for Bulletin WP-22

CULLEN-FRIESTEDT CO., 1303 S. Kilbourn Ave., Chicago 23, Ill.

Deep Drawn Refrigerator Hydrator Trays. Dies of Strenes. 2,000,000 Stampings When War Stopped the Run.

You

WILL BE A STRENES METAL ENTHUSIAST!

If you could cast to shape and lower the machining time on your die castings from ⅓ to ½ —the saving in both time and cost would help immeasurably on your post-war tooling.

If you could draw and form several times as many pieces as formerly, even on deep draws, between redressings, that also would help.

Strenes metal dies for drawing and forming press work can give you the above results and should be investigated at once.

Practically all manufacturers of automobiles, trucks, tractors, farm implements, refrigerators, stoves use Strenes metal dies—as do firms in many other fields. So can you—and to your advantage in cost and time.

Names of users on request.

THE ADVANCE FOUNDRY CO.

100 Seminary Ave., Dayton 3, Ohio

STRENES METAL

DRAWING AND FORMING DIE METAL

FERROALLOY PRICES

Ferromanganese

78-82% Mn, maximum contract base price per gross ton, lump size, f.o.b. car at Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.

Carload lots (bulk)	$135.00
Carload lots (packed)	141.00
Less ton lots (packed)	148.50

$1.70 for each 1% above 82% Mn; penalty, $1.70 for each 1% below 78%.

Manganese Metal

Contract basis, lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Spot sales add 2c. per lb.

96-98% Mn, .2% max. C, 1% max. Si, 2% max. Fe.

Carload, bulk	36c.
L.c.l. lots	38c.

95-97% Mn, .2% max. C, 1.5% max. Si, 2.5% max. Fe.

Carload, bulk	34c.
L.c.l. lots	35c.

Spiegeleisen

Maximum base, contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Carloads	$35.00	$36.00
Less ton	47.50	48.50

Electric Ferrosilicon

OPA maximum base price cents per lb. contained Si, lump size in carloads, f.o.b. shipping point with freight allowed.

	Eastern Zone	Central Zone	Western Zone
50% Si	6.65c.	7.10c.	7.25c.
75% Si	8.05c.	8.20c.	8.75c.
80-90% Si.	8.90c.	9.05c.	9.55c.
90-95% Si.	11.05c.	11.20c.	11.65c.

Spot sales add: 45c. per lb. for 50% Si, .3c. per lb. for 75% Si, .25c. per lb. for 80-90% and 90-95% Si.

Silvery Iron

Silvery Iron, Silicon 14.01 to 14.50 per cent, $45.50 per G. T. f.o.b. Jackson, Ohio. Add $1.00 per ton for each additional 0.50% Si up to and including 18%. Add $1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%. Covered by MPR 405.

Silicon Metal

OPA maximum base price per lb. of contained Si, lump size, f.o.b. shipping point with freight allowed to destination, for l.c.l. above 2000 lb., packed. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
96% Si, 2% Fe.	13.10c.	13.55c.	16.50c.
97% Si, 1% Fe.	13.45c.	13.90c.	16.80c.

Ferrosilicon Briquets

OPA maximum base price per lb. of briquet, bulk, f.o.b. shipping point with freight allowed to destination. Approximately 40% Si. Add .25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	3.35c.	3.50c.	3.65c.
2000 lb-carload	3.8c.	4.2c.	4.25c.

Silicomanganese

Contract basis lump size, per lb. of metal, f.o.b. shipping point with freight allowed. Add .25c. for spot sales. 65-70% Mn, 17-20% Si, 1.5% max. C.

Carload, bulk	6.05c.
2000 lb. to carload	6.70c.
Under 2000 lb.	6.90c.
Briquets, contract, basis carlots, bulk freight allowed, per lb.	5.80c.
2000 lb. to carload	6.30c.
Less ton lots	6.55c.

Ferrochrome

(65-72% Cr. 2% max. Si)

OPA maximum base contract prices per lb. of contained Cr, lump size in carload lots, f.o.b. shipping point, freight allowed to destination. Add .25c. per lb. contained Cr for spot sales.

	Eastern Zone	Central Zone	Western Zone
0.06% C	23.00c.	23.40c.	24.00c.
0.10% C	22.50c.	22.90c.	23.50c.
0.15% C	22.00c.	22.40c.	23.00c.
0.20% C	21.50c.	21.90c.	22.50c.
0.50% C	21.00c.	21.40c.	22.00c.
1.00% C	20.50c.	20.90c.	21.50c.
2.00% C	19.50c.	19.90c.	21.00c.
66-71% Cr, 4-10%	13.00c.	13.40c.	14.00c.
62-66% Cr, 5-7% C	13.50c.	13.90c	14.50c.

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2c. per lb. to regular low-carbon ferrochrome price schedule. Add 2c. for each additional 0.25% N. High-carbon type: 66-71% Cr, 4-5% C, 0.75% N. Add 5c. per lb. to regular high-carbon ferrochrome price schedule.

Low-Carbon Ferromanganese

Contract prices per lb. of manganese contained, lump size, f.o.b. shipping point, freight allowed to destination, Eastern Zone. Add 0.25c. for spot sales.

	Carloads, Bulk	Ton Lots	Less Ton
0.10% max. C, 1 or 2% max. Si.	23.00c.	23.40c.	23.65c.
0.15% max. C, 1 or 2% max. Si.	22.00c.	22.40c.	22.65c.
0.30% max. C, 1 or 2% max. Si.	21.00c.	21.40c.	21.65c.
0.50% max. C, 1 or 2% max. Si.	20.00c.	20.40c.	20.65c.
0.75% max. C, 7.00% max. Si.	16.00c.	16.40c.	16.65c.

Ferrochrome Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 60 per cent contained chromium. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	8.25c.	8.55c.	8.95c.
Ton lots	8.75c.	9.25c.	10.75c.
Less ton lots	9.00c.	9.50c.	11.00c.

Ferromanganese Briquets

Contract prices per lb. of briquet, f.o.b. shipping point, freight allowed to destination. Approx. 66 per cent contained manganese. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carload, bulk	6.05c.	6.30c.	6.60c.
Ton lots	6.65c.	7.55c.	8.55c.
Less ton lots	6.80c.	7.80c.	8.80c.

Calcium—Manganese—Silicon

Contract prices per lb. of alloy, lump size, f.o.b. shipping point, freight allowed to destination.

16-20% Ca, 14-18% Mn, 53-59% Si. Add 0.25c. for spot sales.

	Eastern Zone	Central Zone	Western Zone
Carloads	15.50c.	16.00c.	18.05c.
Ton lots	16.50c.	17.35c.	19.10c.
Less ton lots	17.00c.	17.35c.	19.60c.

Calcium Metal

Eastern zone contract prices per lb. of metal, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. Add 0.9c. for Central Zone; 0.49c. for Western Zone.

	Cast	Turnings	Distilled
Ton lots	$1.80	$2.30	$5.00
Less ton lots	2.30	2.80	5.75

Chromium—Copper

Contract price per lb. of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi River. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si. Add 2c. for spot sales.

Shot or ingot	45c.

Ferroboron

Contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination. Add 5c. for spot sales. 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.20	$1.2075	$1.229
Less ton lots	1.30	1.3075	1.329

Manganese—Boron

Contract prices per lb. of alloy, f.o.b. shipping point, freight charges allowed. Add 5c. for spot sales.

75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C.

	Eastern Zone	Central Zone	Western Zone
Ton lots	$1.89	$1.903	$1.935
Less ton lots	2.01	2.023	2.055

Nickel—Boron

Spot and contract prices per lb. of alloy, f.o.b. shipping point, freight allowed to destination.

15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.

	Eastern Zone	Central Zone	Western Zone
11,200 lb. or more	$1.90	$1.9125	$1.9445
Ton lots	2.00	2.09125	2.0445
Less ton lots	2.10	2.1125	2.1445

PRICES

Other Ferroalloys

Ferrotungsten, Standard grade lump or ¼X down, packed, f.o.b. plant at Niagara Falls, New York, Washington, Pa. York, Pa., per lb. contained tungsten, 10,000 lb. or more....	$1.90
Ferrovanadium, 35-55%, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. contained Va.	
Open hearth	$2.70
Crucible	$2.80
Primos	$2.90
Cobalt, 97% min., keg packed, contract basis, f.o.b. producer's plant, usual freight allowances, per lb. of cobalt metal.....	$1.50
Vanadium pentoxide, 88-92% V_2O_5 technical grade, contract basis, any quantity, per lb. contained V_2O_5. Spot sales add 5c. per lb. contained V_2O_5.....	$1.10
Silcaz No. 3, contract basis, f.o.b. producer's plant with usual freight allowances, per lb. of alloy. (Pending OPA approval)	
Carload lots	25c.
2000 lb. to carload.....	26c.
Silvaz No. 3, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy (Pending OPA approval)	
Carload lots	58c.
2000 lb. to carload.....	59c.
Grainal, f.o.b. Bridgeville, Pa., freight allowed 50 lb. and over, max. based on rate to St. Louis	
No. 1	87.5c.
No. 6	60c.
No. 79	45c.
Bortram, f.o.b. Niagara Falls	
Ton lots, per lb.....	45c.
Less ton lots, per lb.....	50c.
Ferrocolumbium, 50-60%, contract basis, f.o.b. plant with freight allowances, per lb. contained Cb.	
2000 lb. lots	$2.25
Under 2000 lb. lots.....	$2.30
Ferrotitanium, 40-45%, 0.10%C. max. f.o.b. Niagara Falls, N. Y., ton lots, per lb. contained Ti..	$1.23
Less ton lots.....	$1.25
Ferrotitanium, 20-25%, 0.10%C. max., ton lots, per lb. contained titanium	$1.35
Less ton lots.....	$1.40
High-carbon ferrotitanium, 15%-20%, 6-8% carbon, contract basis, f.o.b. Niagara Falls, N. Y. freight allowed East of Mississippi River, north of Baltimore and St. Louis, per carload.....$142.50	
Ferrophosphorus, 18% electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with $3 unitage freight equalled with Rockdale, Tenn., per gross ton.....	58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage freight equalized with Nashville, per gross ton	$75.00
Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., any quantity, per lb. contained Mo.	95c.
Calcium molybdate, 40-45%, f.o.b. Langeloth and Washington, Pa., any quantity, per lb. contained Mo.	80c.
Molybdenum oxide briquets, 48-52% Mo. f.ob. Langeloth, Pa. per lb. contained Mo.....	80c.
Molybdenum oxide, in cans, f.o.b Langeloth and Washington, Pa. per lb. contained Mo.....	80c.
Zirconium, 35-40%, contract basis, f.o.b. producer's plant with freight allowances, per lb. of alloy. Add ¼c. for spot sales	
Carload lots	14c.
Zirconium, 12-15%, contract basis, lump f.o.b. plant usual freight allowances, per lb. of alloy	
Carload, bulk	4.6c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, carload, bulk	5.75c.
Ton lots	7.25c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, f.o.b. Philo, Ohio, with freight not to exceed St. Louis rate allowed, per lb.	
Car lots	8.00c.
Ton lots	8.75c.
Less ton lots	9.25c.

A.I.S.I. HY-TEN S.A.E. N.E.

ALLOY STEELS FOR VICTORY

Scientifically selected to conserve critical alloys and meet the requirements of the AIRCRAFT, ORDNANCE, and MACHINE TOOL industries.

Complete "EARMARKED" stocks of Aircraft alloy steels at Buffalo and Detroit.

WHEELOCK, LOVEJOY & CO., INC.

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Cleveland 14, Chicago 23, Newark 5, Detroit 3, Buffalo 10, Cincinnati 32

KRANE KAR HANDLES STEEL *Faster*

Move a KRANE KAR up to a pile of forgings, bars, blooms, billets, ingots, castings, (or a scrap heap when equipped with an electric magnet), and top the boom with the full load. Transport load forward or backward and position it on either side in places inaccessible to a rigid boom crane. Make speed with the all-around safety features—stability without jacks or outriggers; automatic braking of load and boom, easy steering, and utter simplicity of operation. KRANE KAR saves time and labor; reduces handling costs. Write for Catalog No. 58.

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Agents in the Principal Cities

THE ORIGINAL SWING BOOM MOBILE CRANE WITH FRONT-WHEEL DRIVE AND REAR-WHEEL STEER

2½, 5, AND 10 TON CAPACITIES

KRANE KAR

SILENT HOIST & CRANE CO., 851 63RD ST., BROOKLYN 20, N.Y.

RIGHT... down the line in types and sizes

You'll find all types and sizes of Bay State Grinding Wheels for all types of work ... RIGHT, down the line. Centerless grinding, cylindrical grinding, disc grinding, internal grinding, snagging, cutting-off, etc. . . . Sizes, shapes, bonds, grades, grains, and structures to meet specific requirements right.

And once you have determined on a type and size that suit your job right, you can expect to get the very same qualities on repeat orders. "Top performance, consistently duplicated" results from extremely close control over materials and manufacturing processes plus such Bay State features as

"Fractional Grades"— 3 degrees of hardness within every grade; developed to permit a closer fit of grit to grind.

"Controlled Porosity" — a precise method of spacing cutting units which not only makes closer selection possible but also exact duplication.

Such a combination of features are your assurance of getting grinding wheels that are RIGHT — down the line. So whatever your needs for grinding wheels, look into the advantages offered by Bay State's complete line. Write for bulletin to get additional facts.

BAY STATE ABRASIVE PRODUCTS CO.
2 Union Street, Westboro, Mass.

BAY STATE

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GRINDING WHEELS · HONING AND SUPERFINISHING STONES · PORTABLE SNAGGING WHEELS
MOUNTED WHEELS AND POINTS · CUT-OFF WHEELS · INSERTED-NUT DISCS · AND CYLINDERS